Integration of Air Quality-Related Planning Processes: Report

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Executive Summary

This report explores the potential for integrating three community-based, air quality-related planning processes into a single process. A number of communities in British Columbia and elsewhere have conducted air quality (or airshed) management plans, greenhouse gas management plans and/or community energy plans. This study evaluates the use of these three processes by local governments and First Nations in identifying and addressing air quality-related objectives, and determines to what extent they might be integrated to achieve multiple planning objectives for air quality, greenhouse gas emissions, and energy supply and conservation.

Nine case studies in British Columbia and a further three outside the province were researched to gain insight into how communities are currently handling emissions- and energy-related inventory and planning work, and their experiences with or considerations for an integrated process. A number of lessons learned and findings were drawn from this research which have informed the development of a framework for integrated planning and a number of recommendations for local and senior governments.

Lessons Learned

A number of key lessons learned emerged from the case studies that point to common elements of successful planning processes. These are:

- Organization and Stakeholder Involvement
    - Establishing largely autonomous, multi-stakeholder decision-making and advisory teams
    - Ensuring high quality communication and stakeholder engagement
- Messaging and Focus
    - Integrating air quality-related processes into broader municipal planning processes
    - Agreeing on common, consistent, simple messaging
    - Focusing effort on actions that can deliver multiple benefits
    - Using energy as a focal point
    - Building on early action/success
    - Marketing implementation initiatives based on local priorities
- Leadership/Champions
    - Gaining senior political and administrative support for integration
    - The importance of champions, staff and consultants attuned to integration
- Resources and Capacity
    - Securing long-term resources
    - Building a strong base of technical capacity

Findings

There are substantial similarities between the three processes and, therefore, there is a significant opportunity to pursue an integrated or complementary process that properly considers tradeoffs, identifies initiatives that deliver multiple benefits, and streamlines implementation. While there are differences in the specifics of each process and, in some cases the order in which the steps are carried out, all three processes involve the following seven broad steps:

1. Establishing committees and staff/technical resources;
2. Characterizing the current emissions/energy profile and establishing a baseline;
3. Consulting with key stakeholders and the broader community to establish priorities, goals and targets;

4. Developing a number of options for energy management/emissions reduction and establishing the environmental, social and economic impacts of each;
5. Developing a plan by selecting a number of preferred options;
6. Implementing the plan; and
7. Monitoring and reporting with a mechanism to review and adapt the plan.

Merging the processes provides significant opportunity for complementary benefits because the main source of many air emissions, including both greenhouse gases and common air contaminants, is the consumption of fossil fuel-based energy. A major focus for all types of plans is the reduction of fossil fuel energy consumption through supply and demand side management initiatives such as renewable energy projects, transportation demand management initiatives, green building strategies and working with point source polluters. Focusing on these types of projects will generally bring complementary air quality, GHG and energy-related benefits.

There are a number of additional important benefits to integration including:

- Proper consideration of synergies and tradeoffs;
- More robust solutions when multiple objectives are satisfied;
- Energy-related economic opportunities;
- Mutually supportive planning elements;
- More comprehensive links with energy and air quality aspects in other local government planning documents;
- More efficient use of resources and cost effectiveness;
- Facilitation of corporate and community buy-in; and
- Reduced consultation fatigue.

Even so, the three planning studies can also present opposing priorities in some cases and there are a number of challenges to integration including:

- Possible dilution of focus and support;
- Conflicts between objectives in certain communities (especially forest resource-based where wood burning is a primary source of common air contaminants[1]);
- Technical difficulties of creating combined inventories and acquiring reliable data for baselines; and
- Securing necessary technical expertise.

A Path Forward: Recommendations and Next Steps

The report outlines a framework for an integrated planning process and makes recommendations regarding how an *integrated* or *complementary* process might be conducted. Considerations regarding integration are offered within a process framework common to all three separate planning processes.

It is not necessary to invent a completely new process. Rather, the three existing air quality-related planning processes are amenable to various levels of combination and integration. Differences in community priorities, potential conflicts between energy, air quality and GHG measures, and dissimilarities in levels of local government technical expertise resist a one-size-fits-all approach to integrated planning at the local level. A modular process that allows each community to follow its own unique path, tailored to unique priorities, circumstances and abilities is the preferred approach.

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[1] The PCP Program considers bio-based fuels such as wood to be GHG neutral. Therefore, substituting "cleaner burning" fossil-fuels for wood may lead to improved local air quality but increases in GHG emissions if other steps are not also taken to improve overall efficiency.

It is recognized that an integrated approach is not appropriate for all communities. In some cases, communities should consider a "complementary" approach wherein the plans are conducted as separate exercises (at different times) but in such a way that the core issues of the other plans and the work/resources required to complete all plans are efficiently deployed.

Senior governments could support an integrated approach by:

- Establishing a supportive environment for integrated air quality-related planning;
- Directly assisting with technical capacity issues;
- Working with industry and other partners;
- Increase the financial viability and affordability of planning processes and energy-related investment for local governments and First Nations; and
- Co-ordinating related federal and provincial initiatives.

Finally, the report considers a number of "next steps" for the Provincial Government to move the concept of an integrated process forward with the assistance of other partners. These include:

- Conduct a high level screening to determine the number of communities that might suit an integrated approach;
- Discuss the series of options for provincial support with key stakeholders; and
- Identify resources required to support communities engaging in an integrated process.

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1 INTRODUCTION

This report explores the potential for integrating three community-based air quality-related planning processes into a single process. The study evaluates the use of these processes by local governments and First Nations in identifying and addressing air quality-related objectives, and determines to what extent these processes might be integrated to achieve multiple planning objectives for air quality, greenhouse gas emissions, and energy supply and conservation.

1.1 Background

Throughout British Columbia and the rest of Canada, municipalities, First Nations and regional governments are addressing the related issues of local air quality, climate change and community energy supply and use. Separate planning processes have evolved for each of these three areas, principally: Air Quality Management Planning (AQMP)[2], Greenhouse Gas (GHG) Action Planning and Community Energy Planning (CEP). This work is supported and encouraged by a variety of agencies, both government and NGOs.

Airshed and air quality management plans (AQMPs) aim to identify and manage common air contaminants such as particulate matter (PM_{10} and $PM_{2.5}$), nitrogen oxides, carbon monoxide, sulphur oxides, volatile organic compounds and other toxic substances. A key driver for air quality management plans is the reduction of human and environmental health impacts in the community resulting from smog and toxics in the local airshed.

Greenhouse gas action plans[3] aim to limit the release of greenhouse gas emissions such as carbon dioxide, nitrous oxide, methane, and other substances. The key driver for greenhouse gas action plans is mitigation of global climate change.

Community energy planning is focused on identifying energy sources and the demand for energy within a municipality, and undertaking a comprehensive planning exercise to reduce the consumption of fossil fuel energy. Key drivers for community energy planning are often either economic development or cost savings for the community and may result in greater self-reliance and technological innovation.

Several municipalities in British Columbia and the rest of Canada have pursued these air quality-related planning processes as separate exercises. However, the overlaps in process and objectives amongst the plans and the limited available community resources, suggests that an integrated approach may be the most cost effective way for local governments to achieve local air quality, energy, and greenhouse gas objectives.

1.2 Purpose of the Study

The intent of this study is to review the various planning processes available to local governments to address air quality-related objectives, and assess to what extent these processes might be integrated to achieve multiple planning objectives cost-effectively. This work consisted of two distinct parts:

1. Understand current municipal planning processes for air quality, GHG and energy management:
    - How is planning currently being handled in BC and other jurisdictions?
    - How do these municipalities undertake emission/energy inventories?

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[2] Also referred to as Airshed Management Planning (AMP)

[3] Also referred to as Climate Change (Action) Plans

- Where are the areas of overlap and differences between the processes?
- What are the benefits of an integrated approach?
- What are the challenges of an integrated approach?

2. Develop recommendations on whether or not and how these processes may be integrated, including:
    - Recommendations on an integrated or complementary approach to inventories; and
    - Recommendations on an approach to integrated planning.

In order to understand the scope and practicality of integrating the three types of plans, the study examined a number of case studies in British Columbia and elsewhere in Canada, concentrating, where possible, on those jurisdictions that have pursued a more integrated approach to air emissions and energy planning. An examination of the case studies has informed our recommendations regarding which of the elements of the different processes (planning, public and stakeholder consultation, data gathering etc.) can be effectively combined.

1.3 Structure of the Report

Following this introduction, the report is structured as follows:

Section 2 provides an overview of the three types of air quality-related planning processes. This section also summarizes the case studies, and provides a summary view of the key lessons learned from them.

Section 3 describes the rationale and implications of integration by making observations about the commonalities and differences as well as the benefits and the challenges of integrating the three types of planning processes.

Section 4 outlines a suggested framework for an integrated planning process and provides a number of recommendations for both local and senior governments wanting to engage in an integrated approach.

In the interests of brevity the full text of the case studies and the long list of lessons learned from them are included as appendices to the main body of the report.

2 APPROACHES TO AIR QUALITY-RELATED PLANNING

The following is an overview of experience to date and lessons learned with air quality, GHG and community energy planning processes both in British Columbia and in other jurisdictions. It is presented as follows:

- Overview of the three planning processes: air quality, GHG and energy
- Review of planning experience within and outside of British Columbia
- Summary of key "lessons learned"

2.1 Overview of Planning Processes

A brief overview of the three planning processes follows. Exhibit 2-1 provides an overview of the key drivers, government players, legislation and resources for the three planning processes. The key steps of each process are illustrated in Exhibit 2-2. Appendix A provides a more detailed description of each, with commentary on their scope and application within BC.

2.1.1 Air Quality Management Planning

The emission of common air contaminants (CACs) can have an adverse impact on air quality, which can affect both human health and the environment. The most commonly identified CACs include particulate matter (PM), nitrogen oxides, sulphur oxides, volatile organic compounds and carbon monoxide. These gases have an impact both on their own and through formation under certain conditions of secondary pollutants such as ground-level ozone and a portion of PM. Air quality management planning (AQMP) is an area- or airshed-based process undertaken to identify the sources and impacts of certain air pollutants, and to develop a strategy to minimize those emissions.[4] The most common reason for initiating AQMPs is to reduce the impact of poor air quality on human health (e.g. asthma, pulmonary illnesses) and the physical environment (e.g. damage to soils and water bodies). In general, AQMP's include the following steps:

- Identify and monitor common air pollutants to establish air quality compliance with federal, provincial and regional standards;
- Determine the relative contribution of different air pollutants to air quality;
- Conduct detailed inventory to identify sources of pollution;
- Conduct modeling to determine future air quality scenarios;
- Develop strategies to reduce air pollution;
- Establish stakeholder priorities and concerns as related to pollution sources and potential solutions to reduce impacts;
- Establish ambient air quality targets; and
- Represent stakeholder values by jointly developing solutions to achieving goals through the adoption of an air quality management plan.

Currently, seven local governments in British Columbia have or are completing an AQMP. Several others are in the preliminary stages.

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[4] An airshed is a geographic area where air quality is influenced by similar emission sources, meteorology and terrain features. Note that in certain cases, secondary pollutants such as smog can form at a substantial distance from the emission source of its constituent pollutants.

Exhibit 2-1: Comparison of Key Drivers, Government Players, Legislation / Policy and Resources Informing the Three Planning Processes

	Air Quality Management Planning	**Climate Change Planning**	**Community Energy Planning**
Key Drivers			
	• **Protection of human health:** Air pollution can lead to premature death, increased hospital admissions, more emergency room visits and higher rates of absenteeism • **Protection of environmental health:** Environmental effects include acid rain and damage to soil and water bodies • **Tourism Development:** Perceptions regarding air quality can positively or negatively affect tourism	• **Protection of global environmental health:** Greenhouse gas emissions contribute to global warming • **Reducing dependence on fossil fuel energy:** Fossil fuel is a major source of GHGs and is a non-renewable resource	• **Local economic development:** Locally produced energy provides local employment opportunities • **Energy security:** Locally produced energy and/or energy efficiency increases the ability to provide energy • **Energy efficiency:** Reducing demand of energy increases availability and can even prevent or delay new energy projects at a community scale and can significantly reduce energy costs at an individual scale
Key Government Players			
Federal	• **Environment Canada (EC), Health Canada (HC)**	• **Environment Canada, Natural Resources Canada (NRCan)** • **Federation of Canadian Municipalities (FCM), Partners for Climate Protection (PCP)**	• **Natural Resources Canada**
Provincial	• **Ministry of Water, Land and Air Protection**	• **Ministry of Water, Land and Air Protection**	• **Ministry of Energy and Mines**
Regional	• **Greater Vancouver Regional District** (GVRD) • **Fraser Valley Regional District** (FVRD)	• **Greater Vancouver Regional District**	• **Greater Vancouver Regional District**
Local	• **Municipal Governments, First Nations**	• **Municipal Governments, First Nations**	• **Municipal Governments, First Nations**
Legislation / Policy / Objectives			
Federal	• **Canadian Environmental Protection Act** (EC) ○ *National Ambient Air Quality Objectives* ○ *Canada Wide Standards* ○ *The Corporate Smog Action Plan (EC)* ○ *Pollution Prevention Plans (EC)* ○ *Virtual Elimination Plans (EC)* ○ *On-Road Vehicle and Engine Emission Regulations*	• **Kyoto Protocol** (United Nations) • **Climate Change Plan for Canada** (Gov't of Canada)	• **Energy Efficiency Act** (NRCan)
Provincial	• **BC Environmental Management Act** former **Waste Management Act** (BC Ministry of Water, Land and Air Protection (WLAP)) • **BC Environmental Assessment Act** (Environmental Assessment Office, Ministry of Sustainable Resource Management) • **BC Motor Vehicle Act** (AirCare) • **Provincial Air Quality Objectives**	• **The Province of BC is currently developing a Climate Change Plan**	• **BC Energy Plan** (BC Ministry of Energy and Mines (MEM)) • **Energy Efficiency Act** (BC MEM)
Regional	• GVRD has delegated authority for AQ issues under WMA • **Air Quality Management Bylaw** (GVRD Only) • **Regional Air Quality Objectives**		
Local	• **Air Quality (Management) Plan** • **Official Community Plan** • **Land use/Transportation Planning** • **Bylaw authority under Local Government Act**	• **PCP Participation** • **Official Community Plan** • **Land use/Transportation Planning** • **Bylaw authority under Local Government Act** • **Climate Change (GHG) Action Plan**	• **Community Energy Plan** • **Official Community Plan** • **Land use/Transportation Planning** • **Bylaw authority under Local Government Act**
Resources / Guides			
	• **Guide to Airshed Planning in British Columbia** (Draft stage at time of printing) (WLAP) • **1995 British Columbia Emissions Inventory of Common Air Contaminants and Greenhouse Gases**	• **ICLEI/CCPC Protocol/Guidelines for Reporting, Draft 3.0, April 1999** • **FCM knowledge network web site and linked documents** • **Greenhouse Gas (GHG) Action Guide** (GVRD)	• **A Toolkit for Community Energy Planning in BC** (Community Energy Association) • **Community Energy Planning – A Guide for Communities** (Draft stage at time of printing) (NRCan)

2.1.2 Greenhouse Gas Action Plans

The Intergovernmental Panel on Climate Change (IPCC) has concluded that anthropogenic emissions of greenhouse gases (notably CO_2, CH_4 and N_2O) are having an impact on global climate. Greenhouse gases are distinct from other air pollutants (such as CACs) in that their impact is global. As a result, processes to reduce GHG emissions are generally initiated at a municipal, regional or national level rather than at an airshed level. At a local level, the Government of Canada and the Federation of Canadian Municipalities (FCM) have committed to assisting Canadian municipalities in their efforts to reduce GHGs through their Partners for Climate Protection (PCP) initiative. The goal of PCP is to assist communities to slow climate change by reducing GHGs, save local money and resources, and support the development of local sustainable communities. Reductions in GHGs are expected to be achieved through building retrofits, renewable energy, energy efficient land-use, transportation planning, infrastructure design, green procurement, water conservation, and solid waste diversions.

PCP includes a five 'milestone' framework: 1/ creating a GHG inventory, 2/ setting a GHG reduction target, 3/ developing a local action plan, 4/ implementing the plan, and finally 5/ monitoring progress and reporting results. A participating community can implement milestones in the order prescribed by the FCM or in an order that suits their needs. For instance, many communities have begun by completing a greenhouse gas inventory, while others have moved immediately to actions aimed at reducing GHG emissions. Currently, 39 municipal governments in British Columbia are members of PCP.

2.1.3 Community Energy Planning

Although definitions vary slightly, a Community Energy Plan (CEP) generally involves development of a long-term strategy to increase the quality of life through a systems approach to the efficient use of energy and utilization of local and/or sustainable energy supplies. CEPs undertaken by the BC-based Community Energy Association (CEA) includes the consideration of energy supply and demand in urban, regional and neighbourhood design and development, land use and transportation planning, site planning, and building design, infrastructure design, energy-efficiency and alternative energy supply options.

CEA provides three approaches to community energy planning.[5] Briefly, they are:

- **Single Issue Energy Plan:** A single energy-related issue which becomes a catalyst for local involvement in energy planning.
- **Comprehensive Energy Plan:** Typically carried out when there are a broad range of energy supply and demand issues of concern.
- **The Energy Component Approach:** CEP takes the form of a component or 'add-on' to broader community planning processes such as regional growth strategies, official community plans, a neighbourhood concept plan, or site design.

The key drivers for CEPs are economic development through greater self-reliance and technological innovation, and reduced energy costs. Reduction in greenhouse gas emissions and common air contaminants is also frequently cited as a goal of CEP. Currently, at least 13 local governments and First Nations in British Columbia have or are completing a CEP or a CEP-related process.

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[5] A Toolkit for Community Energy Planning in BC, Community Energy Association

Exhibit 2-2: Overview of Air Quality-Related Planning Processes

Stage	**Air Quality Planning Process**[1]	**Partners for Climate Protection (PCP) Planning Process**[2]	**Community Energy Planning Process**[3]
1 *Establish committees, staff, support, consultants, etc…*	**Establish Advisory Committees** • Planning members /stakeholders chosen	**PCP Membership** • Municipality appoints staff FCM Liaison • Municipal staff seek council support through resolution	**Establish Teams** • Depending on the scope of the plan, active planning members chosen
2 *Characterize existing conditions & trends*	**Identification / Measurement / Monitoring** • Conduct air quality monitoring • Determine compliance with standards **Inventory** • Develop an accurate emission inventory to identify all sources of air pollution **Modeling / Forecasting** • Assess current and future air quality using air quality modeling techniques	**Milestone 1 - Inventory** • Inventory of energy use and solid waste for estimation of GHG emissions • Forecasting	**Energy Profile / Inventory** • Baseline energy consumption and costs evaluated
3 *Consultation with community, stakeholders to establish priorities, goals and targets.*	**Establish Stakeholder Priorities** • Priorities and concerns related to air quality and air pollutants determined	**Milestone 2 - Targets** • Stakeholder consultation process • Council adoption of corporate and community targets	**Clarify Community Goals** • Goals compliment existing priorities • Public processes / community consultation
4 *Develop options to reduce emissions and/or better manage energy*	**Air Pollution Reduction Strategies** • Strategies and measures developed to reduce air pollutants affecting air quality	**Milestone 3 – Local Action Plan** • Consultation / participation of stakeholders to confirm reduction targets for corporate (municipal operations) & the community at large and related actions	**Create Plan Options** • Analysis • Tradeoffs evaluated
5 *Plan development: Analysis of impact of options, further consultation, target refinement, decision making, trade offs evaluated*	**Revision of Strategies** • Circulate a draft Plan for review and comment • Revise the draft Plan as a result of the consultation program		**Identification of Energy Opportunities** • Stakeholders crucial to the implementation of the plan are consulted for opportunities **Evaluation and Selection of Approach** • Alternatives are weighed against goals
6 *Implementation of plan*	**Implementation** • Implement the approved plan	**Milestone 4 - Implementation** • Management of implementation strategy • Staffing, financing, projects allocated	**Determine Action Plan** • Formation of implementation plan • Ideally, communication plan included • Official recognition of plan
7 *Monitoring, reporting and plan adaptation*	**Revision of Plan** • Revise Plan periodically • Assess achievements and deficiencies	**Milestone 5 - Monitoring** • Progress monitored • Results reporting and updates	**Monitoring Results/Evaluate Scenarios** • Indicators evaluated • Reporting/ review regime determined

[1] Process followed by the Greater Vancouver Regional District (GVRD) for their AQMP. Processes do vary, but are similar in general approach

[2] Process proposed by the Partners for Climate Protection Initiative (Federation of Canadian Municipalities)

[3] Process proposed by the Community Energy Association (CEA), A Toolkit for Community Energy Planning in BC, rev. ed. 2001. Processes do vary, but in general are similar.

2.2 Municipal Experience with Planning Processes

This section provides an overview of municipal experience to date with the three planning processes. The study team developed case studies for nine communities in British Columbia and three others outside of the province. In each case, the team researched available literature and interviewed local representatives to explore the following questions:

- How is planning currently being handled in BC and other jurisdictions?
- How do these communities handle emission/energy inventories?
- Where are the areas of overlap between the planning processes?
- What are the challenges and opportunities of adopting an integrated approach?
- What role can senior governments play in assisting municipalities with an integrated approach?

A brief overview of the nine B.C. communities is provided in Exhibit 2-3 with complete case studies in Appendix B. Exhibit 2-4 provides an overview of the three communities outside BC, with details in Appendix C.

Exhibit 2-3: Summary of Case Studies: Communities in British Columbia

Municipality	Planning Processes	Overview of Initiative
Quesnel	CEP, AQ	The City of Quesnel is dominated by the forest resource-based industry and recent challenges in this sector have led to a declining population. Three quarters of the City's GHG emissions and the majority of common air contaminants are produced by the City's industrial forest products sector which includes 2 pulp mills, a plywood manufacturer, a particle board manufacturer and sawmills. Energy consumption in the community is rising, in part, as a result of increased energy use for space heating. Health concerns around poor air quality and the City's interest in addressing energy-related concerns such as rising energy prices have led to an Air Quality Management Planning Process and the foundation work for a CEP. **Air Quality Planning:** In December 1999, triggered by increasing concern over health and visual impacts of poor air quality, a *community-driven* Airshed Management Planning process was initiated in Quesnel to study the local air quality problem and make recommendations to improve air quality in the community. The planning is being done in collaboration with neighbouring Williams Lake. Both communities formed their own air quality management committee and they have identical frameworks for the final Air Quality Management Strategy. The William's Lake process deliberately lags the Quesnel process by one year so that lessons learned from the Quesnel process can be applied to William's Lake. **Community Energy Planning:** The City has recently worked with the Pembina Institute and the BC Community Energy Association to develop the City of Quesnel Community Energy Options Report, 2003 (CEOR). This report provides the "building blocks for Quesnel to develop a community energy plan" but falls short of a full CEP in that it doesn't commit to a series of actions and has yet to be supported through a public consultation process (i.e. *city-driven versus community*). Development of a full CEP is one of the key recommendations of the report. These planning processes have been completed largely in isolation but the CEP work stressed the potential for synergies between the two, identifying several potential measures that achieved AQ, GHG and community development goals at the same time. **GHG Action Planning:** Quesnel recently joined the PCP initiative, but has not yet completed Milestone One.
Kamloops	CEP, GHG, AQ	Kamloops is one of British Columbia's larger inland communities, with 80,000 people in 1997. In 1997, the City developed 'KAMPLAN 1997' as a growth management strategy to set policies and guide City Council and the community into the next century. This plan included environmental goals, a Community Energy Plan module and was primarily created to preserve or increase the city's health and the residents' overall quality of life through continued population growth and urban development. The execution of KAMPLAN 1997 earned Kamloops a Sustainable Community Award from the Federation of Canadian Municipalities (FCM) in 2000. The KAMPLAN is currently being updated (in 2004) and the Community Energy Plan module is being integrated into various parts of the plan rather than the CEP being identified as a separate part of the plan. **Community Energy Plan (CEP)** • Included a comprehensive portfolio of policies and actions with topics from alternative fuel use to energy management protocols, from energy modeling to subdivision planning, for both municipal and community energy actions. • Underpinned by energy-efficiency principles and supported by a sound energy management culture of the city • Driven by cost savings, environmental benefits and liveability goals • Visionary plan at the time, including co-generation, use of waste heat and sub-hub community design; however, full implementation has been impeded in part by the lack of identified City representatives to be responsible for monitoring and reporting on performance and achievement of each task/ goal. **Greenhouse Gas Action Plan (GHG Action Plan)** • Launched in 1997 to implement the FCM's Partners for Climate Protection (PCP) initiative in Kamloops • Committed the city to reduce its 1990 levels of GHG emissions by 20% by the year 2005

Municipality	Planning Processes	Overview of Initiative
		• Milestones 1 and 2 are complete and the CEP is being reviewed for application to meet Milestone 3 (a Local Action Plan) **Air Quality Initiative** • Identified potential for air quality issues in the community and some actions have been pursued, but as of yet no formal plan or budget developed
Whistler	TNS, CEP, GHG, AQ	Whistler is an extremely successful recreational resort, the third busiest ski resort in the world. The Resort Municipality of Whistler (RMOW) is acutely aware that this success is founded on the exceptional outdoor recreational facilities coupled with the Canadian image of a clean, natural environment. Therefore, one of the key resort business strategies is to preserve that image through protection of the natural environment. Consequently, Whistler has adopted number of progressive initiatives in recent years to manage the environmental impacts of population and tourism growth. This has included adoption of The Natural Step in 2000 as an umbrella framework for more detailed work, the completion of the Whistler Environmental Strategy (WES) and the initiation of a Comprehensive Sustainability Plan in 2001 which is on-going. An **Integrated Energy Plan (IEP)** was recently completed that is the first initiative in Canada to include energy, air quality, and GHG management planning in one document. Integrating energy, air quality and greenhouse gas planning in Whistler is more straightforward than in most municipalities because almost all emissions are fuel based. Unlike many other communities that have significant agricultural and industrial emissions, Whistler emissions are predominantly from the commercial, residential and transportation sectors. Therefore, creating a reliable integrated energy and emissions inventory was relatively simple. GHGs and CACs could be reliably estimated using standard conversion factors. The Whistler plan is significant in that it is part of a broader sustainability initiative (CSP) which is using **The Natural Step** as a organizing framework. This seems to have worked well for the community and has created a relatively straightforward set of principles that the community has been able to rally around.
Bulkley Valley - Lakes District	AQ	The Bulkley Valley - Lakes District includes the communities of Smithers, Burns Lake, Houston, Telkwa and New and Old Hazelton in central British Columbia. Elevated particulate levels resulting from various burning processes, road dust, stack emissions and other regulated emissions (such as those from a particle board plant and an asphalt plant) mean that the community often suffers poor air quality episodes at various times during the year. This has led to concerns of health impacts as well as impacts on the tourism industry, in part due to poor visibility. **Air Quality Management Plan:** Early grass roots work commenced in the late 1980's and formal airshed management planning has been ongoing in the Bulkley Valley - Lakes District since 1992. The Ministry of Water, Land and Air Protection currently maintains continuous air quality monitoring in Burns Lake, Houston, Telkwa, and Smithers. The 1999 revision of the Bulkley Valley Air Quality Management Plan is serving as the basis for the 2003/2004 airshed management planning process currently being undertaken. The scope of the new plan is different and in many ways the community is starting from scratch. Completion of the new plan is expected in March 2004. Initially, when the co-ordinating committee was established, the possibility of integrating GHGs, CEP and the concept of zero waste was raised. However, at this early stage it was felt that there was too much complexity in the process already. However, the project co-coordinator feels that these elements can be introduced as capacity and understanding among stakeholders is built. The comfort level and capacity of community to understand complex issues has built quickly. In BVLD most of combustion sources are wood and, therefore, many fuel sources are already carbon (and GHG) neutral. The other major fuel is gasoline and diesel for transportation purposes. In remote, low-density communities there are few transportation alternatives and it is felt that there is little appetite at this time to address fuel consumption for transportation. However, there may be an appetite for cheaper, lower emission sources of fuel, perhaps biofuels if these can be shown to perform as well and cost no more than conventional fuels. The plan is scheduled for public release in Spring, 2004.
City of North Vancouver	CEP, GHG	The City of North Vancouver (CNV), a municipality of 44,000 residents, is quickly becoming a leader in building a model sustainable community in the Lower Mainland. Through participation in the FCM PCP process and through the incorporation of the Lonsdale Energy Corporation (LEC), the CNV has made strides towards realizing community-wide goals.

Municipality	Planning Processes	Overview of Initiative
		GHG Plans: The CNV has completed the 2nd milestone of the PCP process and has recently issued an expression of interest to consultants for the development of Milestone 3 – Local Action Plan. **Community Energy:** A District Energy System (DES) emerged as a viable energy-related business opportunity for the CNV through council participation in FCM sponsored events in the early 90's. As a result, CNV council put forth policy and by-laws to support the implementation of a DES and the Lonsdale Energy Corporation (LEC) was born. The DES delivers high-efficiency energy to customers in the Lower Lonsdale neighbourhood through the production of hot water at a series of mini-plants within the neighbourhood.
City of Vancouver	AQ, CEP, GHG	The City of Vancouver has addressed energy and emissions through a wide range of initiatives over the past 25 years, as outlined below. **Air Quality:** Vancouver's management of Air Quality is tied closely with the Greater Vancouver Regional District (GVRD) which has regulatory jurisdiction over air contaminants. Vancouver participates with the GVRD in its Air Quality Management Plans, and works with the GVRD and TransLink to implement associated measures. **GHG Plans:** Vancouver continues to work on reducing GHG emissions, including current initiatives (Cool Vancouver) to develop Climate Change Action Plans (CCAP) for both itself as a corporation and for the community as a whole. The City is applying to FCM for milestone 3. **Community Energy:** Vancouver has not completed a formal "Community Energy Plan" (CEP) for the whole community, but the GHG plan is becoming one almost by default, as its structure covers most elements of a CEP. Vancouver also created a small CEP, in the form of an "Energy Strategy" for its visionary waterfront project, Southeast False Creek. The results from this study are largely transferable to other areas of the city, and particularly to other urban development projects.
District of North Vancouver (DNV)	CEP (Eco-Industrial Network)	The Maplewood Local Plan, adopted by the District of North Vancouver (DNV) council in October 2002, provided the planning framework to support the development of a complete and sustainable community. The DNV entered into a contract with a group of consultants to use an **Eco-Industrial Networking** (EIN) approach to refine the community plan objectives and develop concrete designs and projects to move the plan forward. EIN encourages industrial development that reduces resource consumption; promotes use of renewable energy, promotes natural stormwater flows; protects and incorporates ecological features; and promotes connectivity to other businesses and immediate neighbourhoods. EIN involves a systematic inventory and analysis of energy, material and waste flows in the community. This data is used to identify opportunities for new business and community development as well as efficiency initiatives within the existing businesses and community. As such, it represents a different approach to community energy and greenhouse gas planning that focuses on industrial inputs and outputs and the development of relationships between key stakeholders. The project was initiated by a group of consultants and the now retired Planning Manager. The DNV Planning Dept. then worked closely with the consultants to define the terms of reference for the project and to develop the relationships and trust building required to gain broad support for project and resulting initiatives.
Greater Vancouver Regional District (GVRD)	AQ, CEP, GHG	The Greater Vancouver Regional District (GVRD) is a partnership of 21 municipalities and one electoral area that make up the metropolitan area of Greater Vancouver. The GVRD plays a key role in coordinating and planning regional environmental concerns since as an organisation it supplies and treats potable water, collects and treats wastewater, manages solid waste disposal, develops growth management plans, manages regional parks and has mandated responsibility to regulate air emissions under the BC *Waste Management Act*. The GVRD monitors air quality, and develops and implements air quality plans and regulations. The GVRD has done extensive work in all three air quality-related planning processes and sees three main spheres of influence: corporate initiatives to reduce GHGs and CACs; mandated responsibility for air quality, solid waste and liquid waste management plans, and; working with member municipalities and other partners to promote voluntary initiatives. GVRD's actions in GHG, AQ and CEP are summarised below: **GHG Action Planning:** The GVRD's enrolment in the PCP program in 1996 was the trigger to begin working with municipalities on GHG action plans. GVRD has offered support in the past by developing community inventories for all its member municipalities as well as corporate inventories for those municipalities that showed an interest in completing milestone one of the PCP. They also offer support to develop programs and actions. The first step was to develop a number of programs under the Air2000 initiative that could assist municipalities to reduce emissions.

Municipality	Planning Processes	Overview of Initiative
		These included a Green Buildings Program, Better Buildings retrofit program, an industrial eco-efficiency program and the Eco-Smart Concrete program. The GVRD is now encouraging member municipalities to develop local GHG Action Plans (under the PCP program). As part of this commitment it has developed a Greenhouse Gas (GHG) Action Guide as a resource to help municipal members implement actions that derive a greenhouse gas emission reduction benefit. **Community Energy Planning:** The GVRD has no mandated responsibility for energy planning in the region. However, recognizing the clear relationship between energy, air quality and GHG emissions, the GVRD has pursued a number of initiatives to explore energy efficiency and renewable energy alternatives in the region and encourages member municipalities to adopt these. For example, the GVRD, in association with the then BC Energy Aware Committee, organized a series of workshops for member municipalities that identified energy challenges and opportunities. In addition, the *Forging a Sustainable Energy System in Greater Vancouver: Suggested Approaches and Preliminary Policy Directions for the GVRD (July 2003)* report was completed as a supplementary report for the cities$^{\text{PLUS}}$ international competition. **Air Quality Management Planning:** The GVRD has delegated authority for air management under the *Waste Management* Act. The objective of the GVRD AQMP (1994) was to develop a comprehensive strategy for air quality management in the Greater Vancouver Regional District which assesses issues, prioritizes problems, and develops appropriate actions to protect public health and the environment based on: a) an integrated approach to regional land use, transportation and air quality planning in keeping with the Creating Our Future "Steps to a More Liveable Region"; b) a strengthened management approach for all emission sources for which the GVRD has regulatory responsibility; c) increased cooperation and collaboration with federal, provincial, regional and municipal governments and U.S. authorities in Washington State to achieve an integrated airshed approach to resolving air quality problems in the Lower Fraser Valley air basin; and d) full public and stakeholder involvement to ensure that efficient and effective solutions are identified and applied to specific issues or problems in a fair and equitable manner. The GVRD is currently updating their AQMP and is expected to complete a draft plan by November 2004. It is using a harmonized approach, including concurrent reductions of Greenhouse Gases and Common Air Contaminants through implementation of harmonized emission reduction measures. Consideration of a harmonized approach started several years ago when the GVRD started to think about updating the AQMP. Given the pressing nature of global climate change it was obvious that the GVRD should have both a GHG action plan and an AQMP and it made sense to combine the plans.
Hartley Bay, Gitga'at First Nation	CEP	**Community Energy Plan:** The Gitga'at First Nation Development Corporation approached the Pembina Institute to conduct a study to explore sustainable energy options for the Hartley Bay community. This evolved into a project to develop a Community Energy Plan. The emphasis of this CEP is on electricity options, although energy demands that are currently met by other energy resources such as wood, propane and oil are also considered. The purpose of developing this CEP was: • To recommend the most environmentally and economically appropriate combination of energy supply systems to meet the community's energy requirements; • To assess the potential for providing a sustainable electricity system for Hartley Bay; • To build awareness in the community about energy supply and use; and • To consider economic development opportunities. The extent of the project included a feasibility study for micro-hydroelectricity, and will include completion of the CEP implementation plan (not yet completed).

Exhibit 2-4: Summary of Case Studies: Communities outside British Columbia

Municipality	Planning Processes	Overview of Initiative
Portland, Oregon, U.S.A.	CEP, GHG	Portland is considered to have one of the most advanced environmental management systems in North America. It is one of the only municipalities (if not the only municipality) to have successfully reduced per capita GHG emissions in the past ten years. Most of the City's actions are directed by the Office of Sustainable Development (OSD), a group with about 30 staff who direct activities involving waste management, energy, climate change and other environmental portfolios. Responsibility for air quality is at the State level and is therefore not handled directly by the City. The management structure of the City of Portland provides a considerable advantage to environmental actions: of the 5 city commissioners (who ultimately vote on the City's directions), one carries OSD in their portfolio and another carries climate change. Therefore, any energy/climate change initiative automatically have at least 2 of 5 votes at the City's highest decision-making level. The City's actions in energy and GHG are as follows: **Community Energy Plan:** Portland first adopted an energy policy in 1979 in the wake of the OPEC oil embargo and shortages. At that time, it was the first local energy policy in the US and included the establishment of an Energy Office and citizens' Energy Commission. In the late 1980's, the City took a fresh look at energy issues and developed a new plan based on principles of sustainability – in 1990 they developed a revised Energy Policy. This plan served as a blueprint for actions related to reducing greenhouse gases. The city reviewed this policy in 2000 and decided to fold its actions under the City climate change plan, reasoning that CC gave them a broader "umbrella" than energy (for example, it could include issues such as waste management) and also has social relevance that energy does not have. **GHG Action Plan:** In 1993 Portland *joined ICLEI's original pilot group for* Cities for Climate Protection (PCP, administered by FCM is the Canadian component of this international ICLEI initiative) and developed a Carbon Dioxide Reduction Strategy. In 2001 Portland City Council and the Multnomah County Board of Commissioners adopted a joint Local Action Plan on Global Warming that updated (and superseded) the earlier version. Results obtained are favourable. Overall, from 1990 to 2001, per capita CO2 emissions decreased significantly, from 16.9 to 15.6 metric tons, largely due to aggressive electricity-conservation efforts promoted by local utilities, the State of Oregon, and the City of Portland.
Toronto, Ontario	GHG, AQ	Municipalities within the Greater Toronto Area (GTA) have developed some of the most comprehensive clean air and GHG reduction programs in Canada. Although the City of Toronto initiated many of these programs, efforts have since spread to other municipalities within the GTA. There are two main programs within the GTA that target GHG reductions: **The Toronto Atmospheric Fund (TAF)** was initiated in 1992 by a dedicated city councillor, with funds of $23 million from the sale of city property. TAF is a revolving fund that helps stimulate investment in projects that reduce GHG emissions and improve air quality. While its core mandate is oriented towards climate change and GHG emission reductions, TAF is heavily involved in clean air issues. **Clean Air Partnership (CAP)** is a registered charity operating over the Greater Toronto Area. CAP's programs focus on engaging the communities within the Greater Toronto Area to reduce local GHG emissions and smog precursor emissions. Although CAP was originally created by TAF, it has since become an independent, "third party" entity that receives funding from a number of partners (including TAF). Specific air quality initiatives include the GTA Clean Air Council (CAC), Annual Smog Summit, Air Quality Strategy, Smog Advisories and Smog Response Plans. A selection of the results achieved, for both Toronto and the GTA, are outlined below. • TAF's endowment has financed - at no taxpayer expense – carbon dioxide emission reductions totalling upwards of 225,000 tonnes. • Projects financed by TAF loans have saved the City $17.5 million in corporate expenses. • Better Buildings Program (BBP) – has facilitated retrofits of over 460 city owned and non-city owned buildings. • Matching investments by building owners and managers of $126 million produced annual energy savings of $19 million and created 3,800 person-years of employment.

Municipality	Planning Processes	Overview of Initiative
		- Better Transportation Partnership (BTP): a program aimed at accelerating the replacement of the in-house vehicle fleet of the City, its Agencies, Boards and Commissions. The program currently offers the opportunity to acquire one additional light duty dedicated natural gas vehicle. - At the 2000 Smog Summit, three orders of government (Federal, Provincial and City of Toronto) signed the Toronto Inter-Govemmental Declaration on Clean Air, the first of its kind in Canada.
Sudbury, Ontario	CEP, GHG, AQ	Among mid-sized Canadian municipalities, Sudbury has been particularly pro-active in seeking solutions to environmental improvements in all areas of municipal life. Sudbury's program began with a strategic energy plan for the community through a partnership with ICLEI; it identified 86 measures for improvements in building energy efficiency, district heating, wastewater treatment and solid waste management. The aggregate payback of the package was estimated at 7 years, with a total capital cost of $4.5 million. Rather than choosing a few of the quick payback measures for implementation, staff opted to go for the entire package, reasoning that a "leap" is far more effective than a series of small steps. This initiative also aims to reduce energy use through increased efficiency, with targeted savings of at least $5 million annually. The seven year payback is longer than normally approved by Council; ICLEI assisted in "selling" Council on accepting the longer payback. Other measures, such as traffic signalization energy reductions have since been implemented. Strong partnerships with industrial representatives have also developed over the years resulting in multiple benefits for the community and industry. **GHG Planning:** The EarthCare Sudbury initiative, started in 2000 has become the focal point for Sudbury's Local Action Plan (LAP). The LAP initiative has been selected by FCM as a model for communities across Canada. The city has a new dedicated Division of Environmental Innovation and Energy Initiatives, which will continue to implement the LAP. **Community Energy Plan (CEP):** The CEP includes activities to increase the energy efficiency within the corporation (i.e. municipal buildings); a Community Energy Efficiency Strategy, as well as a Community Energy Supply Strategy. Drivers for a CEP include reduced municipal and community costs for energy, as well as the economic benefits associated with energy dollars spent locally. For the CEP, completed retrofits on municipal buildings (identified through an energy audit) have reduced carbon dioxide emissions by 26 %, and saved 30 % of annual energy costs, or $1 Million annually. **Air Quality Initiative:** The City is developing an Air Quality Initiative, driven by health concerns related to ground-level ozone carried north from southern Ontario, as well as local environmental concerns related to sulphur dioxide emissions from local mining activities.

2.3 Lessons Learned

Although the case studies involved communities with a wide range of characteristics (metropolitan, industrial resource-based, tourism-based, First Nations), a number of common themes emerged. This subsection discusses some of the "big picture" lessons learned about the common elements of successful processes. These are organized into four areas:

- Organization and stakeholder involvement
- Messaging and Focus
- Leadership and Champions
- Resources and Capacity

Appendix D provides a more complete list of lessons learned, sorted by issue category.

It is important to note that none of the case studies revealed a situation where the municipality began with an integrated approach. Each municipality profiled began with more focused initiatives. Some ended up with a highly integrated process (Whistler, GVRD) whereas others kept the processes largely separate (Quesnel, City of North Vancouver). Therefore, some of the lessons learned are not directly relevant to a fully integrated process. Rather, they speak to good practice generally in air issues planning and point to considerations for pursuing either integrated or at least complementary processes. As a matter of fact, some communities use community energy planning to fulfill PCP (GHG action plan) requirements. Section 3 takes these lessons learned and, in combination with the authors' experience deduces a number of findings that are directly relevant to an integrated process.

2.3.1 Organization & Stakeholder Involvement

- **Establishing Largely Autonomous, Multi-stakeholder Decision-making and Advisory Teams**
  Municipalities have had some success in driving local GHG/clean air/energy action through largely independent decision-making bodies. Involvement of the community and private and public sector stakeholders in these bodies also helps to ensure that decisions are transparent and have the buy-in of all involved. Toronto Atmospheric Fund's (TAF) arm's-length status in Toronto has helped the organisation co-ordinate action among various public and private sector stakeholders. In the Greater Toronto Area (GTA), the Clean Air Partnership's registered charity status enables it to coordinate programs among competing municipalities and divergent interests. In Sudbury, the city formed the EarthCare committee, a largely independent multi-stakeholder body and focal point for ongoing efforts involving clean air, GHG reduction and energy independence. Prior to EarthCare, ICLEI Energy Services served as a credible third-party advisor on the suite of actions that launched Sudbury's programs (thereby reducing the city's "risk" if they were seen as a biased proponent). In B.C., this approach, involving a consensus-based process led by a trusted third party, has worked well for Quesnel and the Bulkley Valley Lakes District. Quesnel's Environment Society an NGO has, for example, acted like a board of directors for the Air Quality Planning Process and gives approval for spending. This has been a very successful arrangement.

  Coordination by a stable autonomous group helps provide credibility and durability to the process. Portland's Office of Sustainable Development (with a staff of 30) has developed into a semi-autonomous group with access to both tax-based and external funding for "opportunistic" projects. This has enabled the OSD to drive a wide array of long-term initiatives.

- **Ensuring High Quality Communication and Stakeholder Engagement**
  Broad, early stakeholder engagement and consensus-based processes have been critical to the development of some plans (Bulkley Valley, Quesnel, Sudbury). In the case of Bulkley Valley Lakes District a strong communications plan and "rules of engagement" for the committees has also been essential. Sudbury has found that written commitments by senior corporate officials has opened doors and expedited the process.

  These planning processes thrive on partnerships between municipalities, utilities, industries and the other organizations. They depend on the active engagement and participation of many stakeholders who work together toward common goals (especially Bulkley Valley Lakes District, District of North Vancouver).

  The City of Kamloops' experience highlights the need to develop a strong sense of ownership in the plan from those who will implement it. Excessive involvement from parties unwilling or unable to contribute to implementation may be counter-productive.

  Whistler, on the other hand felt that many people were suffering consultation fatigue because of several related initiatives. Therefore, stakeholder engagement was handled as part of the consultation for parallel initiatives such as the transportation and waste management plans.

2.3.2 Messaging and Focus

- **Integrating Air Quality-Related Processes into Broader Municipal Planning Exercises**
  Holistic systems approaches to environmental management and sustainability provide the context (including broad goals and principles) to ground energy or emissions management activity within the community's larger concerns. Air quality-related planning processes can either be part of a larger sustainability framework (e.g., The Natural Step, Environmental Management System) or build off other similarly-oriented processes (e.g., Eco-Industrial Networking (EIN)). The Sudbury case study highlights the value of linking, and looking through, the high level organizational/strategic goals of a local government (e.g., regional growth strategy, OCP, Environmental Management System, etc) to inform the direction of goals/strategies/principles/direction of an integrated approach.

  Whistler's "Integrated Energy Plan" for example was developed within the context of a Comprehensive Sustainability Planning (CSP) initiative that is using the Natural Step as an organizing framework. Recommendations from the Whistler plan will be implemented through other municipal planning initiatives such as the Transportation Strategy, Waste Management Strategy and updated OCP.

  In Kamloops, the OCP was developed alongside the CEP and published shortly thereafter. The OCP contains a number of energy-related policies. It is also related to parallel programs such as the development of an environmental management system and sustainability indicator tracking systems. This approach is credited with avoiding duplication of resources, improving efficiency, data consistency and relevance.

  In the District of North Vancouver, EIN has proven a useful way to approach issues of energy and GHGs as part of a broader initiative to address economic and community development in a particular mixed-use neighbourhood. Neighbourhood-focused projects such as this can serve as a springboard for broader community discussion regarding energy consumption/generation and GHGs.

The City of Vancouver's approach to air quality, GHG and energy issues involves a dialogue with a variety of complementary planning processes: Greenhouse Gas emissions reduction (Climate Change) planning; regional Air Quality Planning; Sustainability Action Planning process; regional and local transportation planning; and green development and green building initiatives are all part of on-going direction towards a more sustainable city. It is not clear whether any one of the above planning initiatives was driven by any of the others, but they are working together to deal with related issues, maintain momentum and leverage resources.

The GVRD, for the past several years, has been developing the Sustainable Region Initiative. This is serving as the framework within which regional level plans (such as the AQMP) are updated and new initiatives (such as green Building, renewable energy, and transportation) are developed.

- **Agreeing on Common, Consistent and Simple Messaging**
  No one single message resonates best in all municipalities. In certain cases, energy issues are a flashpoint, and in others clean air is able to mobilize action. Coordinated messaging has inherent opportunity and risk. The opportunity is to identify, package and 'harmonize' actions that have multiple benefits (as has been the priority in the GVRD, Whistler and the City of Vancouver), then focus public consultation on whichever of the benefits most resonate within the community at that time (Portland). However, integrating processes can result in multiple messaging that risks confusion among stakeholders, especially in the early stages of a process where the scope and purpose of the planning process may not be clear (Bulkley Valley Lakes District). Yet again, a comprehensive framework and process can help informed stakeholders see the important interrelationships between air quality, GHG emissions and energy. Such is the case in Whistler where the four basic principles (system conditions) of The Natural Step[6] have provided an invaluable context around which the community has been able to rally.

- **Focus Effort on Actions that can Deliver Multiple Benefits**
  Communities that have achieved most success with an integrated process have focused on complementary measures that deliver both air quality and GHG reduction benefits such as energy efficiency (GVRD, Whistler, City of Vancouver, Kamloops). The GTA's most recent Smog Summit (2003) was entitled "Smog and Energy Use – Make the Connection", clearly making the connection between clean air and GHG emissions reductions strategies.

- **Using Energy as a Focal Point**
  Energy consumption is the source of many common air contaminants (CACs) and greenhouse gases (GHGs). This common contributor of air pollution and greenhouse gas emissions is, therefore, an appropriate focal point for an integrated program. Also, energy-related investments can almost always be financially justified. For example, Sudbury Council committed significant up-front capital costs based primarily on the energy savings, with additional "co-benefits" in terms of local job creation and energy independence. Portland's 1990 Energy Policy had a similar basis for its launch. In short, a great deal can be done on energy supply and demand before there is a need to "trade off" with GHG and clean air concerns. In most British Columbia communities,

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[6] The Natural Step states that in order for a society to be sustainable nature must not be subject to systematically increasing: 1) concentrations of substances from the Earth's crust 2) concentration of substances produced by society 3) degradation by physical means; and 4) in society human needs are met worldwide. Source: www.naturalstep.org

energy-focussed actions will reduce most GHG emissions and could substantially improve air quality. In addition, energy-related projects can be a local economic development opportunity as well as an opportunity to address environmental issues. This business perspective can be of interest to a wider municipal audience (City of North Vancouver).

- **Building on Early Action/Success**
  A number of communities have focused on early action and successes to generate confidence and an appetite for further action amongst stakeholders. For example, the GVRD found it useful to develop initiatives/programs that provided municipalities with realistic opportunities to reduce emissions (AIR2000 initiatives such as Eco-Smart Concrete, Better Buildings Program etc.) before embarking on the work to develop GHG action plans.

  In the District of North Vancouver's Maplewood Project, early work that brought together stakeholders to discuss shared energy management will act as a springboard for further energy efficiency, renewable energy generation and GHG reduction initiatives in the community.

  The City of North Vancouver focused almost exclusively on action-oriented projects and is now following with more planning-oriented initiatives that are building on early success with a municipal energy corporation. Greater Sudbury uses pilot projects to make identifiable gains and use these to "sell" additional initiatives.

- **Marketing Action Steps Based on Local Priorities**
  If an integrated approach has been taken and measures have been identified that have significant complementary benefits, it may make the actions in the plan easier to justify. When it comes to implementing a plan with co-benefits, integration provides the opportunity of "selling" the ideas on the basis of better energy management, GHG reduction, or air quality improvements. The particular approach can focus on the community's current set of priorities. In Portland, although programs are focussed on reducing GHG emissions, the City "sells" them under different banners (e.g. quality of life, city greening, reduced traffic congestion, energy savings etc.) that are more likely to gain public support.

2.3.3 Leadership/Champions

- **Gaining Senior Political and Administrative Support**
  Leadership commitment at a senior staff, political and community level within a municipality will largely determine whether an integrated approach can be successful. An integrated, let alone a singular, approach will only succeed if the benefits to community leaders are clear.

  The progression from broad statements of intent (policy) to specific action and projects is a challenge for every community. Senior municipal staff and politicians must be prepared to recommend and make difficult decisions. These decisions will have significant implications on long-term planning strategies (e.g., on health, housing, transportation, agriculture, industry), on staffing capacity and on longer-term finances. Only strong leadership and key decisions will assure successful air quality, energy and GHG management within the community.

  In all cases, the active involvement of senior officials (both elected and staff) is a necessary element for both program launch and ongoing implementation. The success of Sudbury's initiative is attributed to the overwhelming commitment of senior officials and councillors, and to the city's unique "social contracts" that commit key partners to the initiative. In Toronto, the formation and ongoing success of TAF is credited in large part to the active support of councillors and senior staff. In B.C., GVRD, Quesnel and the City of Vancouver also exemplify this high level of internal commitment.

- **The Importance of Champions, Staff and Consultants Attuned to Integration**
  The success of integrated processes in a number of communities has depended on the work of key champions, staff or consultants who are attuned to the benefits of an integrated approach. (Quesnel, GVRD). In Quesnel, a local councillor is a strong sustainability champion and has been a stalwart supporter of the CEP and related OCP process. He is now championing a biofuels initiative.

  The person or organization championing an integrated approach tends to vary from community to community. In some cases it is a consultant, in others a ministry or municipal staff member, in others a member of the local community. Ultimately, however, as Kamloops' experience has shown, it is critical not to rely on champions in the long term but rather to institutionalize understanding so staff, stakeholder and political changes can be weathered.

2.3.4 Resources & Capacity

- **Securing Long-Term Resources**
  Each of the three planning processes are inherently long-term, and therefore require significant, stable, long-term funding for staff time, technical consultants and consultation. In Toronto, the $23 million sale of public lands allowed the City to launch the Toronto Atmospheric Fund (TAF), and the revolving fund that TAF uses to fund many of its operations and activities. This stable funding allows TAF's programs to operate independently of year-to-year budget shifts, thus enabling TAF to develop long-term programs appropriate for chronic issues such as clean air and GHG emission reductions.[7] In the case of Sudbury, work by an external consultant identified a $4.5 million package of investments with a 7-year payback. Council instituted a policy change allowing for this long-term investment, and provided the long-term funding that served as the backbone for subsequent measures. In the case of Portland, the Office of Sustainable Development (with a staff of 30) has developed into a semi-autonomous group with access to both tax-based funds and external funds for "opportunistic" projects.[8]

  Municipalities that have stable, long-term funding available are more likely to be successful candidates for an integrated process as air quality-related planning requires sustained effort and long term commitment. Such funding, however, should not be limited to initial research and feasibility studies but, to the extent possible, apply to implementation measures and monitoring of results. In some cases, there may be the opportunity to redirect energy-related cost savings back into the program, providing a 'closed loop' incentive system for all key stakeholders.

- **Building a Base of Strong Technical Capacity**
  Municipalities with knowledge in-house or with access to technical expertise (through ICLEI, industry, utility, province) can address planning in an integrated manner (given funding resources and leadership/stakeholder support are also present).

  In addition to the planning processes, technical capacity is required to implement some of the measures. This applies especially to the energy sector since, in general, energy has been a provincial concern, BC municipalities have not generally developed a high level of expertise or experience in this sector. The research indicates that BC municipalities are much less involved and lack capacity to be involved in the energy sector when compared to other municipalities across Canada. Other Canadian municipalities, namely in Ontario and Alberta, have been active in the energy sector and, therefore, have a greater depth of experience and expertise in implementing related projects.

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[7] Edmonton Alberta has a similar fund that it uses to fund energy efficiency initiatives.

[8] Portland has succeeded more than most jurisdictions in effecting a "value change" within the community, in part due to state laws that require municipalities to engage in long-term planning.

3 INTEGRATION: RATIONALE AND IMPLICATIONS

The previous section highlighted the experiences of a number of communities, many of which have combined more than one planning approach. This section examines the rationale and implications for a more integrated approach, including the key similarities and differences between the three processes, the benefits and opportunities for integration and some potential challenges that might be encountered.

3.1 Similarities and Differences Between the Planning Processes

Relatively speaking, there is little difference between a CEP and a GHG management plan. Energy Planning and GHG planning are already well intertwined in most cases and the majority of CEPs pursue reduced GHGs as a goal (Quesnel, Hartley Bay). Both address long-term problems, both focus on energy use (with the exception of landfill gas for GHGs) and both involve an overall process and inventory methodology that is reasonably consistent. Technically, the process of inventorying and measure identification for both of these processes is relatively straightforward. For these reasons, municipalities appear to have little difficulty in integrating GHG and Community Energy Plans, regardless of which came first. The completion of a Community Energy Plan can satisfy the requirement of PCP milestones 1 and 2 with some additional work to calculate a 1990 baseline and forecast and to develop inventories for both corporate and community emissions.

GHG Action Plans and Community Energy Plans typically share a lot more in common with each other than they do with airshed management plans. The more detailed and frequent airshed inventory, monitoring and reporting protocol is one of its distinguishing features. Airshed Planning is driven by regulatory requirements and the need to meet federal and provincial air quality objectives as well as local issues. Airshed inventory work is usually more detailed although this is not as significant where emissions are predominantly fossil fuel energy-based (Whistler for example). In addition, there is usually a different geographic scope for airshed plans as the airshed is usually defined by physical factors while GHG production and energy use are usually (and most easily) measured by political jurisdiction[9].

In spite of these differences between GHG and energy planning on the one hand and airshed planning on the other, there are a number of similarities between all three processes. Although there is a difference in the specific steps required for each of the processes (refer to Exhibit 2-2), including a different order for each step in some cases, the three processes share broad similarities as follows.

1. Establish committees, staff support and technical resources;
2. Characterize existing conditions and trends (including community profile, energy emissions profile, inventory, baseline, forecasting);
3. Conduct initial consultation with stakeholders to establish priorities, goals and targets;
4. Develop options for emissions reduction and/or energy management (and analyze potential impacts);
5. Develop the plan:
    a. Select preferred options and priorities;
    b. Draft the plan;
    c. Conduct further consultation with stakeholders and broader public; and
    d. Refine goal and targets.
6. Implement the plan; and
7. Monitor, report and adapt the plan.

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[9] In some cases, the boundaries of study for AQMPs are defined by political boundaries for the sake of simplicity.

Exhibit 3-1: Summary of Key Similarities and Differences Between the Three Processes

	AQMP	GHG	CEP
Regulatory Requirements	• No (but see Appendix A)	• No	• No
Targets/Standards	• National, Provincial and Regional (GVRD) air quality standards/objectives • Targets established locally	• Targets established locally but typically follow those agreed at National Level - 20% below 1990 levels (corporate), - 6% below 1990 levels (community) by 2008-2012	• No Federal/Provincial standards • Targets established locally
Stakeholders & Consultation	• Public • Municipality • First Nations • Industry (especially holders of air emissions permits) • Local environmental groups • Forestry companies • Agricultural groups • Road dust operators	• Public • Municipality • First Nations • Industry (especially large energy users) • Local environmental groups • Utilities	• Public • Municipality • First Nations • Industry (especially large energy users) • Local environmental groups • Utilities
Study Boundaries	• Airshed defined by topography and meteorology	• Political boundary of community	• Usually political boundary of community
Temporal/Spatial Dimensions	• Temporal and spatial dispersion important. Good temporal/spatial resolution required. Uses monitoring and modelling to determine dispersion.	• Temporal and spatial dispersion of pollutant generally unimportant	• Timing of energy use and location of energy users might be important for peak load management
Characterization of Existing Conditions	• Monitoring of existing ambient air quality & compare with standards • Inventory of existing sources of emissions • Modelling to fill data gaps	• Inventory of existing sources of GHG emissions • Two-track analysis (corporate and community at large)	• Inventory of existing energy supply and consumption
Inventory Approach	• Uses bottom up approach of identifying sources and adding these incrementally to inventory • Emissions factors to convert from fuel consumption can be complex and not always reliable • Large emphasis on accurate data • Reliable estimates difficult to obtain. Large uncertainties	• Uses top down approach of identifying total energy consumption of different types (various fuels, electricity) but converts fuel consumptions estimates to GHG emissions • Emission factors relatively simple and reliable • Reliable estimates easy to obtain	• Uses top down approach of identifying total energy consumption of different types (various fuels, electricity) • Back of the envelope calculations considered acceptable • Reliable estimates fairly easy to obtain
Baseline	• Usually present day	• Requires calculation of emissions in a baseline year (often 1990 to adhere to Framework Convention on Climate Change) • Presents several data challenges for municipalities	• Depends on local priorities • Often aligned with PCP protocol to satisfy Milestones 1 and 3
Forecasting	• Date chosen locally • Complex, involves modelling, many unknowns	• PCP preferred date is 2010 • Based on trends in energy consumption and solid waste management	• Date for future scenarios chosen locally • Relatively straightforward. Based on trends in population, energy consumption and costs
Energy Management & Emission Reduction Measures (see Exhibit 3-2)	• Controls on burning • Emission control technologies • Cleaner burning fuels • Energy efficiency	• Renewable energy supply projects • Energy efficiency initiatives • Landfill gas capture and re-use	• Renewable energy supply projects • Energy efficiency initiatives • Land use planning
Implementation	• Education • Further consultation • Programs, projects • Social marketing	• Education • Further consultation • Programs, projects • Social marketing	• Education • Further consultation • Programs, projects • Social marketing
Measurement and Reporting (Indicators)	• Monitoring of point source and ambient air quality • Air quality objectives	• GHG emissions trends (total and per capita) by source	• % renewable energy • energy consumption per capita (by sector)

In addition, stakeholders consulted during the process are broadly similar and typical strategies and actions (energy and emission reduction measures) often share a lot in common between different processes. The biggest and most obvious opportunities are in identifying win-win emissions reduction / energy measures and in streamlining the implementation of these measures. Exhibit 3-1 summarizes the key similarities and differences between the three planning processes.

Finally, all three types of plans involve a characterization of the type and sources of emissions and/or energy consumption. This is necessary for planning purposes and so that the most effective emissions reduction measures can be prioritized. In general, the data gathered for one type of plan can inform other plans (air quality, energy, GHGs, as well as other related plans such as transportation and sustainability plans/strategies).

The inventories developed for an air quality planning process can, in some cases, be expanded to include GHGs as the GVRD's work has shown. Air emissions inventories often (although not always) require an estimate of consumption of the various types of energy used in the community (for space heating for example) and, as such, it is an easy step to convert this to GHG emissions using standard emission factors. Therefore, for economies that are predominantly based on fossil fuels this is a relatively easy step (Whistler). However, there are a number of exceptions to this rule (see challenges below).

3.2 Benefits of Integration

Conducting the three planning processes as a single exercise has a number of potential benefits including the following:

3.2.1 Proper Consideration of Synergies and Trade-Offs

Integrating the processes allows for proper consideration of trade-offs, priority-setting and efficiencies that pursuing the plans in isolation precludes. An integrated process is therefore more appropriate for "sustainability planning" than single issue plans. Each type of plan often leads to similar types of implementation measures (see Exhibit 3-2). Therefore, integrating the planning processes will reinforce merits of those implementation measures that have a win-win effect for air quality, GHGs and energy management.

3.2.2 More Robust Solutions with Combined Benefits

In a community that faces multiple challenges an integrated approach can lead to more robust solutions. For example, a proposal in Quesnel to develop a combined heat and power facility will not only reduce solid waste and improve the company's bottom line, it will also reduce GHG emissions and improve the community's control of the energy supply.[10]

3.2.3 Economic Opportunities

The experience of several communities indicates that energy-related investments (that usually result in combined GHG and CAC benefits) can almost always be justified on a financial basis. (Portland, Sudbury). Greater Sudbury has found that the driving factor in obtaining commitment to initiatives is the economic case for savings, cost avoidance and greater economic diversity in the community. Often, air issues initiatives can be sold on the basis of economic benefits alone.

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[10] An NRCan working group is currently examining approaches to the quantification of the multiple benefits of integrated planning. (personal communication Ken Church, Project Manager, Community Energy Systems, NRCan.)

For example, the City of North Vancouver has partnered with the Terasen Corporation to develop an energy utility in which the municipality owns shares. This has allowed the community to control emissions and energy prices.

This optimism about economic benefits is echoed in The Report of the BC Climate Change Economic Impacts Panel whose authors "strongly believe that [a made in BC Climate Change Strategy] can be done in a way that continues to develop the province's rich resource base, improves the cost-competitiveness of existing sectors, and grows new industries that diversify the economy and take advantage of expanding export markets.[11]

3.2.4 More Efficient Use of Resources and Cost Effectiveness

The staff teams required for each type of plan are similar and, as such, integrating the plans can serve to streamline staff resources. Consultants able to consult on one type of plan are likely knowledgeable on the other types, or their work can be relatively easily transferred. Significant funds are expended on staff and consultants to conduct baselining and follow up inventory work, to co-ordinate and organize stakeholder consultation, and to provide overall program management services. In general, a coordinated approach between planning processes can realize substantial cost savings for local governments.

3.2.5 Facilitation of Corporate and Community Buy-in

The momentum and learning triggered by one type of plan can be built upon to generate interest in others. Planning processes have a variety of triggers, but the momentum generated by starting one can build enthusiasm amongst politicians, staff and the community for the other planning processes. However, introducing other issues in the absence of a carefully thought through strategy can overwhelm participants and compromise the focus and support for the original planning process (see section 3.3).

3.2.6 Reduced Consultation Fatigue

Consultation fatigue in the community was noted by some of the case study participants (Whistler). This would be especially problematic if three separate planning processes were pursued at the same time or in close succession without a co-ordinated approach to consultation. The stakeholders that need to be consulted during the process are often the same or similar. Therefore, an integrated approach can help to streamline the consultation process and avoid consultation fatigue.

3.2.7 Complementary Energy Management & Emission Reduction Measures

Many of the energy and emission-reduction measures are similar and produce complementary benefits. In many communities, air quality issues are no longer as strongly tied to point source emissions. Area and mobile sources are making larger contributions. There is, therefore, a close relationship between CACs and GHGs because a large proportion of both GHGs and CACs come from fossil fuel energy-related sources. For example, the Lower Fraser Valley emission inventory for 2000 shows that 93% of the Nitrogen Oxides (NOx), 96% of Sulphur Oxides (SOx) emissions, 89% of the Carbon Monoxide, 59% of respirable particulate matter ($PM_{2.5}$) and 41% of Volatile Organic Compounds (VOCs) come from fossil fuel, energy-related sources.[12] This means that in most cases there will be significant co-benefits to reducing fossil fuel energy consumption. The GVRD has found that consideration of energy and GHG issues during the updating of the AQMP has enabled the identification of a number of "harmonized" measures with significant co-benefits.

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[11] Report of the BC Climate Change Economic Impacts Panel, March 2003
http://wlapwww.gov.bc.ca/air/climate/bc_clim_chng_pln_%20pdfs/ccei_report.pdf

The degree of complementarity will vary from community to community. In most cases there is likely to be numerous opportunities to develop complementary measures although it is acknowledged that in some communities this opportunity will be more restricted (e.g. forest resource-based communities). Exhibit 3-2 indicates those strategies/measures that are substantially complementary and those that result in conflict.

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[12] 2000 Emissions Inventory for the Canadian Portion of the Lower Fraser Valley. November 2003. GVRD/FVRD.

Exhibit 3-2: Comparison of Energy Management / Emission Reduction Measures and Achieving the Goals of the Different Planning Processes.

Reading the table*:		
	√ - Indicates small impact	X - indicates negative impact
	√√ - Indicates moderate impact	0 - indicates no impact
	√√√ - Indicates strong impact	( ) – indicates that impact depends on approach taken

Emission Reduction Measures / Initiatives	**Impact of Measure/Initiative on Achieving Goals of Planning Process**			**Opportunity for Integrated Benefits**
	Air Quality Mgmt Planning	**GHG Action Planning**	**Community Energy Planning**	
Measures Relating Mainly to Area Sources				
Controls on forest harvest and agricultural waste burning	√√√	0 or √√	0 or √√	**Small** (unless wood/agricultural waste is instead used as feedstock for biomass-based energy generation)
Residential wood burning initiatives	√√√	√ or X	√ or X	**Small or negative** (depends on approach taken)
Initiatives to reduce road dust	√√√	0 or X	0 or X	**None** (Possible small negative effect on AQ as more energy used to clean, pave streets)
Energy efficient building programs	√√	√√√	√√√	**Large**
Energy cascading, energy harvesting	√	√√√	√√√	**Medium**
Promotion of district heating systems	√	√√√	√√√	**Medium**
Promotion of co-generation (combined heat and power) facilities	√ or X	√√√	√√√	**Medium** (possible negative effect depending on fuel or technology used)
Electrical energy efficiency/DSM initiatives such as promoting the use of compact fluorescent light bulbs, energy efficient home retrofits	√	√√√	√√√	**Medium**
Measures Relating Mainly to Point Sources				
Regulatory or voluntary controls of point source emitters of CACs	√√√	X	X	**Depends on point source type** (possible negative effect from more energy intensive emission control technology)
Tighter energy efficiency standards for point source polluters	√√√	√√√	√√√	**Large**
Measures Relating Mainly to Mobile Sources				
Tighter emission standards for on-road and off-road engines	√√	0	0	**Small** (positive if coupled with alternative fuel vehicles)
Higher fuel efficiency standards for on-road and off-road engines	√√√	√√√	√√	**Large**
Anti-idling bylaws/education programs	√√	√	√	**Small**
Switching from gasoline to diesel engines	X	√√	√	**Small**
Transit investment	√√(√)	√√√	√√√	**Large** (air quality benefits depend on transit type, fuel type used)
TDM initiatives such as bike paths, employee trip reduction programs, etc.	√√	√√	√√	**Medium - Large**
Other				
Land use planning standards	√√	√√√	√√√	**Large** (but very long term benefits)
Development of renewable energy power projects	√√ or X	√√√	√√√	**Large** (depends on existing heat/power source. Potential negative impact on air quality if RE project uses biomass)
Solid waste management/landfill gas capture	√	√√√	(√√√)	**Large** (only if landfill gas used for energy production)

***Note:** The above table is subjective and is meant for broad comparison only and to indicate where there is the potential for significant co-benefits or conflicts. It is not meant as a definitive analysis of the scope of impact of the various emission reduction and energy management measures. In many cases where potential conflicts are noted, the conflict can be mitigated through increased focus on efficiency measures.

Exhibit 3-2: Comparison of Energy Management / Emission Reduction Measures and Achieving the Goals of the Different Planning Processes.

Reading the table*:		
	√ - Indicates small impact	X - indicates negative impact
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	√√√ - Indicates strong impact	( ) - indicates that impact depends on approach taken

Emission Reduction Measures / Initiatives	Impact of Measure/Initiative on Achieving Goals of Planning Process			Opportunity for Integrated Benefits
	Air Quality Mgmt Planning	GHG Action Planning	Community Energy Planning	
Measures Relating Mainly to Area Sources				
Controls on forest harvest and agricultural waste burning	√√√	0 or √√	0 or √√	**Small** (unless wood/agricultural waste is instead used as feedstock for biomass-based energy generation)
Residential wood burning initiatives	√√√	√ or X	√ or X	**Small or negative** (depends on approach taken)
Initiatives to reduce road dust	√√√	0 or X	0 or X	**None** (Possible small negative effect on AQ as more energy used to clean/pave streets)
Energy efficient building programs	√√	√√√	√√√	**Large**
Energy cascading, energy harvesting	√	√√√	√√√	**Medium**
Promotion of district heating systems	√	√√√	√√√	**Medium**
Promotion of co-generation (combined heat and power) facilities	√ or X	√√√	√√√	**Medium** (possible negative effect depending on fuel or technology used)
Electrical energy efficiency/DSM initiatives such as promoting the use of compact fluorescent light bulbs, energy efficient home retrofits	√	√√√	√√√	**Medium**
Measures Relating Mainly to Point Sources				
Regulatory or voluntary controls of point source emitters of CACs	√√√	X	X	**Depends on point source type** (possible negative effect from more energy intensive emission control technology)
Tighter energy efficiency standards for point source polluters	√√√	√√√	√√√	**Large**
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Tighter emission standards for on-road and off-road engines	√√	0	0	**Small** (positive if coupled with alternative fuel vehicles)
Higher fuel efficiency standards for on-road and off-road engines	√√√	√√√	√√	**Large**
Anti-idling bylaws/education programs	√√	√	√	**Small**
Switching from gasoline to diesel engines	X	√√	√	**Small**
Transit investment	√√(√)	√√√	√√√	**Large** (air quality benefits depend on transit type, fuel type used)
TDM initiatives such as bike paths, employee trip reduction programs, etc.	√√	√√	√√	**Medium - Large**
Other				
Land use planning standards	√√	√√√	√√√	**Large** (but very long term benefits)
Development of renewable energy power projects	√√ or X	√√√	√√√	**Large** (depends on existing heat/power source. Potential negative impact on air quality if RE project uses biomass)
Solid waste management/landfill gas capture	√	√√√	(√√√)	**Large** (only if landfill gas used for energy production)

***Note:** The above table is subjective and is meant for broad comparison only and to indicate where there is the potential for significant co-benefits or conflicts. It is not meant as a definitive analysis of the scope of impact of the various emission reduction and energy management measures. In many cases where potential conflicts are noted, the conflict can be mitigated through increased focus on efficiency measures.

3.3 Challenges for Integration

3.3.1 Dilution of Focus and Support

Sometimes a focus on one issue can build momentum and commitment, whereas the spreading out of the resources and intent across many issues can dilute the focus. For example, Vancouver City Council likes the focus on climate change at this time. Vancouver's GHG work has focused Council and staff on many issues related to climate change such that great progress is being made. This challenge of diluting the focus is especially acute in forest-based communities that are much more focused on local air quality considerations and see the introduction of energy and GHG related issues as possibly jeopardizing the delicate progress that has been made (Quesnel, Bulkley Valley - Lakes District).

3.3.2 Conflicting Objectives and Differing Priorities

There is a significant difference between CEP/GHG plans on one hand, and local air quality plans on the other. CEP/GHG plans focus almost exclusively on energy-related issues that are broadly similar from one jurisdiction to another.[13] Conversely, air quality plans tend to focus on a wide range of sources (particulates from wood stoves, nitrogen oxides from vehicles, volatile organic compounds or 'VOCs' from fuelling stations, etc.) and require an approach that can vary significantly from one area or airshed to another. Related to this, is the fact that some local governments can see air quality as a regional and /or provincial responsibility and they are, therefore, reluctant to become involved with air quality management issues.

For these reasons, fully integrating GHG/energy and air quality can be challenging. Municipalities can encounter difficulties in merging these two sets of planning processes if they are not sufficiently aware of the differences between them:

- In fossil-fuel based communities, integration is more straightforward since both air quality and GHG initiatives are focused primarily around energy. For example, in the case of Whistler, emissions are primarily from the commercial, residential and transportation sectors, whereas agricultural and industrial emissions are negligible.
- In forest-dependent communities where air quality is driven largely by burning issues, GHG and energy planning are often given a much lower priority than local air quality issues. In some cases, co-ordinators are concerned that air quality-related initiatives will be jeopardized by introducing GHG and energy-related considerations that conflict with air quality objectives even though they acknowledge that synergies also exist (Bulkley Valley - Lakes District, Quesnel).
- In isolated, off-the-grid communities (applies to many First Nations examples), energy costs and reliability are the key issues and therefore, there may be little incentive to introduce air quality and GHG issues (Hartley Bay).
- In more diverse economies, the patterns are less straightforward. While conflicts exist, there are more opportunities to focus on complementary initiatives where conflict between objectives is minimal (City of Vancouver, GVRD).

As already noted, in many cases energy/emission initiatives are complementary but in some cases there are significant trade-offs. For example, some initiatives to reduce GHG emissions or air emissions may not immediately direct energy systems or priorities in the same way. For instance:

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[13] GHG plans must also address methane production from solid waste disposal.

- Using electricity for space heating in BC will lower GHG and CAC emissions below those for natural gas although the total quantity of energy used will likely increase;
- Replacing gasoline engines with diesel engines results in better fuel efficiency and therefore a reduction in GHG emissions, but an increase in harmful particulate matter (until standards are raised in 2007);
- Some strategies to reduce burning of wood for residential heating (e.g. substituting electricity or natural gas) will conflict with objectives to reduce GHG emissions;[14] and
- Using emission control technology to reduce stack emissions of CACs will increase energy use and GHG emissions.

In these cases where potential conflict exists, each community will have to make a decision about local priorities and whether the "trade-offs" are acceptable. For example, communities with poor air quality may well choose to require some industries to use emission control technology even though this may lead to greater energy consumption and GHG emissions.

3.3.3 Integrated or Complementary Inventories

While the inventories for Climate Change Plans and CEPs are broadly similar and the data sets generally complementary, air quality inventories are generally much more complex, involve a greater number of sources that are difficult to quantify, and apply a different methodology (refer to Exhibit 3-3). Furthermore, once the sources of CACs have been identified, further work is necessary to establish the relative contribution of each source to the air quality problem and this can require sophisticated modelling. The monitoring and reporting schedule for air quality work is more frequent.

The fuel-based component of a local air quality inventory (space heating, rail, and marine transportation etc.) can usefully inform the inventories for GHG action plans/CEPs and vice versa. Despite this, local air quality is determined as much by how fuel is burned as the quantity consumed and, therefore, some additional inventory work is necessary.[15] Additionally, most air quality inventories involve an assessment of many non fuel-based emissions sources and these will generally have no direct relevance for GHG action plans or CEPs. Therefore, air quality inventories will likely continue to be conducted as separate exercises in most cases.

3.3.4 Baselines and Forecasts

GHG emissions for Milestone 2 of the PCP program are analyzed for a baseline year and forecast for a target year. These are recommended to be 1990 and 2010 respectively for both corporate and community emissions.

This is often not the case for CEPs and AQMPs, which generally use the present day as the baseline or in some cases use another date that has some local relevance.

Acquiring reliable data to create a 1990 baseline has proved to be a considerable challenge for most communities (City of Vancouver, GVRD, Whistler). In part, this is due to the lack of utility records for this date. Also, transportation data is hard to obtain (especially for 1990) as detailed traffic surveys are expensive, odometer readings are not collected by ICBC, and AirCare records are incomplete and only available for the lower mainland. In recognition of these challenges, the PCP protocol does allow for municipalities to use a baseline year other than 1990 for which they have reasonable access to emissions data or estimates.

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[14] Wood, like other biomass based fuels is considered GHG neutral under the PCP initiative.

[15] A forthcoming study for FCM (authored by Russ Haycock of Hyla Environmental) on Inventory Methods and Standards will examine this question in more detail.

3.3.5 Technical Expertise

Addressing air quality/GHG/energy-related issues requires expertise beyond the capabilities of most municipal engineering or planning departments, particularly for small communities. The expertise offered by the Province (and in the Lower Mainland, the GVRD) and a growing number of consultants is therefore invaluable, either to provide direct technical analysis or to assist communities in building their technical capacity in-house (refer to all case studies).

An integrated approach will exacerbate the need for technical expertise and assistance. However, moving from an air quality management planning process to an integrated process should, in most cases, be technically straightforward as air quality planning is the most technically demanding of the three processes. Introducing air quality considerations into a CEP or GHG action process is more demanding unless the sources of CACs are predominantly fossil fuel-based.

3.3.6 Two Track Analysis and Strategies

The PCP protocol requires communities to create a "two-track" analysis of GHG emissions – one for corporate (i.e. municipal) operations and a separate one for the community. PCP also suggests development of separate corporate and community action plans. CEPs and Air Quality Plans do not generally use this two-track approach. If the work completed as part of a CEP (or fully integrated plan) is to count towards Milestone 1 and 3, then it is important that this two-track approach be adopted and the methodology outlined in the ICLEI (PCP) protocol followed.

Exhibit 3-3: Comparison of Inventory Approaches

	CACs[16]	GHG[17] (PCP)	CEP[18]
Area Sources			
Prescribed Burning	• Estimate of land area prescribed burned • FRDA II study[19]	• Burning of wood (and other biomass) considered GHG neutral. Therefore, generally not included	• May be examined for opportunity for more efficient use of woodwaste
Space Heating	• Fuel use quantities for natural gas, propane, and fuel oil • Residential fuel wood etc	• As AQMP but also requires amount of electrical energy used	• Same as GHG • Also requires energy costs
Agricultural	• Standard emission factors applied to number of livestock, and crop areas	• Not referenced in PCP protocol	• May be included if important part of local economy
Oil and Gas	• Only evaluates emissions having a local impact	• Upstream emissions not included	• May include upstream energy use analysis but rarely
Others	• Other sources may be important	• Small, difficult to track sources are not included	• Small sources generally not included. Focus is on the "big picture"
Mobile Sources			
On Road Motor Vehicles	• Emissions factors and VkmT (fuel consumption not used) • Important to include intercity transportation and pass through traffic	• Fuel sales in local area • Estimate of VkmT using actual data (AirCare or vehicle road surveys) or modelling • Intercity fuel transportation fuel use is excluded • Highway traffic that is pass through is generally not included	• Fuel sales in local area • Estimate of VkmT using actual data (AirCare or vehicle road surveys) or modelling
Marine Vessels	• Based on fuel consumption data • Emission factors can change depending on engine loading	• Not included as outside jurisdiction of local municipality	• Can be included or omitted
Railways	• Based on fuel consumption data • Also fugitive emissions from open cars	• Not included as outside jurisdiction of local municipality	• Can be included or omitted
Aircraft	• Based on number of take off and landing cycles	• Not included as outside jurisdiction of local municipality	• Can be included or omitted
Point Sources			
Various Point Sources	• Continuous emission monitoring • Manual stack testing • Material balance calculation • Emission factor calculation • Judgement • Permit fee estimates	• Large energy-intensive industrial facilities are treated on a case-by-case basis and therefore amenable to similar evaluation as AQMP	• Large energy-intensive industrial facilities are treated on a case-by-case basis and therefore amenable to similar evaluation as AQMP
Power Plants	• Included as point sources	• Not included (GHG emissions are attributed to consumers not power generators)	• Generally important to include
Natural Sources			
	• Included	• Not included	• N/a
Road Dust			
	• Significant	• N/a	• N/a

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[16] CAC inventory methodologies used in the various Federal, Provincial and local air quality planning processes including the1995 British Columbia Emissions Inventory of Common Air Contaminants and Greenhouse Gases. British Columbia Ministry of Environment, Lands and Parks, May 1999.

[17] ICLEI CCPC Protocol/Guidelines for Reporting. Draft 3.0. April 1999

[18] Community Energy Association (CEA). A Toolkit for Community Energy Planning in BC, rev. ed. 2001 and reference to various case-study CEPs.

[19] Canada – British Columbia Partnership Study Agreement

4 A PATH FORWARD: RECOMMENDATIONS AND NEXT STEPS

This section suggests a possible path forward for municipalities interested in pursuing an integrated (or complementary) air quality-related planning process. Based on the findings of the previous section, it presents a framework for an integrated process, provides recommendations for local governments and First Nations wanting to pursue an integrated approach and discusses a number of options for the role of senior governments to support such an initiative.

By *integrated* air quality-related planning process, we are referring to the blending of two or three air/energy planning processes into a unified, planning process. By *complementary* air quality-related planning processes, we are referring to more than one process that takes place either concurrently or consecutively, with careful management of recognized common elements for current and future phases. It will be important for each municipality to consider which approach best suits its needs. It is a premise of this report that virtually all municipalities in B.C. will eventually wish to establish plans and actions for all three types of air issues and, therefore, either an integrated or a complementary process will be appropriate for each municipality.

4.1 A Suggested Framework for Integrated Air Quality-Related Planning

The twelve case studies undertaken for this project confirm that the nature of energy, air quality and GHG management are sufficiently interconnected to encourage local governments to examine the possibility of adopting a more integrated planning approach. The previous section demonstrated that there is a clear opportunity to conduct air quality, greenhouse gas and community energy planning in a way that reduces redundancy of effort, delivers complementary benefits and streamlines the planning and implementation process.

It is not necessary to invent a completely new process. Rather, the three existing air quality-related planning processes are amenable to various levels of combination and integration. Differences in community priorities, potential conflicts between energy, air quality and GHG measures, and dissimilarities in levels of local government technical expertise resist a one-size-fits-all approach to integrated planning at the local level. A modular process that allows each community to follow its own unique path, tailored to unique priorities, circumstances and abilities is the preferred approach.

There are some basic planning steps that are common to all processes (refer to Exhibit 2-2) although these steps are commonly carried out in slightly different ways. This section outlines a framework for an integrated air quality-related planning process and offers considerations for each of the key steps. An overview of the framework is shown in Exhibit 4-1.

Exhibit 4-1: Framework for an Integrated Air Quality-Related Planning Process

1. Establish Whether an Integrated or a Complementary Approach is Appropriate

Key Questions:
- Is the community emissions / energy profile compatible with an integrated approach?
- Does the community have the capacity?
- Are priorities single issue or integrated in nature?
- Will integration dilute the process / important issues?

2. Form Committees and Secure Staff/Technical Resources

Steering | Advisory | Air Quality | GHG | Energy Systems | *Other*

3. Create the Energy and Emissions Profile

Energy Consumption | Ambient AQ | Emissions Sources | Modelling | Baseline/Forecast

4. Clarify Community and Stakeholder Goals / Establish Targets

Public Participation / Community-Oriented Issue Approach

5. Identify Options for Emissions- and Energy-related Measures

Multiple Objective Opportunities / Understand Conflicting Objectives / Impact Assessment

6. Develop the Plan

Key Steps:
- Determine the most significant opportunities (revealed through inventory work)
- Reveal co-benefits and potential conflicts/trade-offs
- Set strategic policy directions
- Determine who is involved in specific action steps and how
- Develop an action plan
- Develop indicators for reporting

7. Implementation of the Plan

Education, Further Consultation, Projects, Programs, Marketing, Integration into Existing Plans / Policies

8. Monitoring, Reporting & Plan Adaptation

Regular, Transparent Plan Update & Review Schedule

1. Establish Whether an Integrated or a Complementary Approach is Appropriate

During the early stages of planning, communities must decide whether or not an integrated approach is to be taken. While other elements can be introduced at a later stage (as Whistler's experience has shown) it would be advantageous to determine whether an integrated approach is to be adopted from the beginning so that funding commitments can be identified, and a more comprehensive and co-ordinated process planned.

Communities that "think big" can achieve integration from the first step, given access to sufficient technical and financial resources. However, many communities may wish to test the waters, beginning with more narrowly focussed issues/steps that will bring early gains in areas the community feels are important, subsequently building momentum for next steps. Key questions at this stage include:

- Is one of the three processes already underway?
- What is the range of issues that the community is concerned about and are the community's priorities single issue focused (e.g. just local air quality) or integrated?
- Does an initial assessment of the energy/emissions "make-up" of the community suggest opportunities for initiatives that are complementary (i.e. combined air quality, GHG and energy benefits) or are conflicts between initiatives likely?
- Do the community leaders, committees, and stakeholders have the capacity and interest to pursue an integrated approach?
- What is the range of technical support that can be brought to the process?
- Is there a broader process (e.g. sustainability plan, Natural Step process, environmental strategy etc.) underway or on the horizon with which an integrated process can be linked?
- Is there a danger that integration will dilute the process and lead to less traction on the most important issues to the community or can a clear message be crafted that will communicate the benefits of integration?

If it is decided that an *integrated* plan is not appropriate, opportunities to take a *complementary* approach should be explored. In this case, rather than conducting the plans together, the plans would be pursued as separate exercises but in such a way as to anticipate the issues and the work involved in creating other plans. In this way, the duplication of resources can be minimized and possible conflicts avoided. (Note that although the remaining steps following are written for an integrated approach, each step can also be adapted to a complementary approach.)

An integrated plan can be undertaken as a standalone plan or as part of a comprehensive planning exercise. Undertaking an integrated plan as part of a comprehensive planning exercise (such as an OCP or sustainability plan) will ensure that air quality, GHG and energy issues are properly considered along with other community objectives. When it comes to implementation, the plan will have more strength if it is part of a broader planning exercise that is fully supported by the community.

2. Form Committees, and Secure Staff and Technical Resources

An integrated approach will require a broader range of expertise than a single-issue plan. Bringing together the right combination of experience and interests is, therefore, even more critical. Fortunately, effective committees for any of the plans have similar central stakeholders, including representatives from provincial ministries, utilities, fuel companies, most local government departments and advisory committees, and the private sector. If a single committee is too unwieldy to accommodate all key stakeholders, subcommittees may be required for each of the air quality, GHGs and energy processes. In this latter case, however, communication between subcommittees will be vital to identify synergistic opportunities and tradeoffs.

3. **Creating the Energy and/or Emissions Profile**
   Creating an emissions and/or energy profile is challenging for many communities because of the technical difficulty in accurately measuring or estimating emissions and because of the costs involved for staff or consultants.

   As discussed in section 3, characterizing existing and future air quality is generally more complicated than doing so for energy and GHG emissions. While energy and GHG inventories overlap substantially and should be conducted as a single exercise, air quality inventories will in most cases be conducted separately.[20] Notwithstanding this point, the data collected for each inventory can usefully inform the others and the results can be presented in a single document for easy comparison. The City of Quesnel Energy and Emissions Baseline report is a good example of this approach. [21]

   If a community is predisposed to "sustainability" initiatives or is likely to address energy, air quality and GHG emissions as separate exercises over the longer term, conducting inventories in a way that anticipates future work will mitigate the incremental costs of doing new inventories at a later date. Furthermore, an integrated inventory may peak community interest and imply innovative, complementary solutions to address energy and emissions issues.

4. **Clarify Community and Stakeholder Goals/Establish Targets**
   An integrated plan should be aligned with broader community goals and expectations as stated in other planning documents and expressed through public consultation exercises. Broad public participation in development of the plan will lead to greater "buy-in" and less resistance to implementation.

   Communities have chosen various community-oriented issues around which to organize their energy and emissions planning. Organizational categories include economic development, health, long term operating cost efficiencies, waste reduction, and local and global environmental concerns.

   At this stage goals and initial targets corresponding to these goals can be set for air quality (e.g., level of fine particulates in the air), GHG emissions (e.g., GHG emissions per capita and reduction in total GHGs compared to 1990 levels), and energy consumption (including the percentage of energy derived from local renewable resources).

   While these targets should not be rigid at this early stage (and should be revisited at the plan development stage), they can drive significant commitment and innovation. Targets, however, can be less useful if they are not accompanied with a commitment to monitor and report on progress. The Kyoto or PCP targets (6% (community) and 20% (corporate) reduction in total GHG emissions from 1990 levels by 2008-2012) are two high profile volunteer targets that have drawn the attention of some 39 British Columbia municipalities to GHG action plans. Related targets may be set through health standards or a desire to reduce dependency on external energy sources.

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[20] The exception is in communities where air emissions are predominantly fossil fuel based.

[21] City of Quesnel. Nov 2002 (Draft). *City of Quesnel Energy and Emissions Baseline: Baseline of Energy Consumption, Greenhouse Gas Emissions and Local Air Pollutants – 1996, 2001, and 2010.* Prepared for the City of Quesnel by the Energy Aware Committee and the Pembina Institute.

5. **Identify Emissions- and Energy-related Opportunities**

The community must identify, drawing primarily on the energy and emissions inventory, where the most significant energy and emissions reduction opportunities lie. For successful integration, communities should attempt to focus on those energy management and emissions reduction measures that can deliver complementary air quality, GHG and energy benefits (reference to Exhibit 3-2 might be useful at this point). Proposed projects, programs and other initiatives should be fundamentally "multiple-objective" oriented. A good example of this approach includes those case studies where communities are pursuing district-heating systems utilizing wood waste.

This stage also involves an assessment of the potential impact of each measure using a cost-benefit or similar approach. With an integrated approach this involves not only the more traditional financial assessment but will also include a comparison of the air quality, energy consumption (and cost), and GHG emissions impact of each measure. This approach will allow proper consideration of the tradeoffs to be made during the plan development stage.

6. **Develop the Plan**

At this stage, the community will need to compare the tradeoffs for each measure or set of measures and revisit the project's primary goals and objectives. While combined benefits from a host of complementary measures is preferable, the priorities of some communities may force them to adopt measures with competing benefits.

A conceptual plan outlining general ideas or policy directions should be created, utilizing available technical expertise and the guidance of the steering committee. Following the creation of this plan, community and stakeholder consultation will likely be required to refine and ultimately accept the ideas.

The next steps typically involve many smaller group discussions with specific stakeholders who will be directly involved or impacted in implementing the policies and programs outlined in the conceptual plan. Time and resources will be required during this key step to transform the conceptual plan into an "Action Plan" that has "buy-in" from the many stakeholders as implementing any energy or emissions plan requires many stakeholders to take action.

From this work, a number of alternative scenarios for the future can be developed that describe what the energy and emissions profile of the community could look like in the future.

Plan Contents

An integrated plan document is likely to include the following key sections:

I. Executive summary

II. Introduction - background, purpose, goals

III. The community profile – that describes the basic physical and institutional characteristics of the community that influence emissions and energy consumption. Includes population and housing statistics, transportation data, industrial/institutional/commercial statistics, landfill data etc.

IV. The existing energy and emissions profile (existing energy consumption patterns, emission of common air contaminants, emission of greenhouse gases, baselines for 1990 and perhaps other years)

V. Scenarios – that describe future conditions including:

  a. A "Business as Usual Scenario" if no energy or emission reduction measures are pursued; and

  b. One or more "Alternative Scenarios" that correspond with a recommended set of energy and emission reduction measures.

VI. An implementation plan that prioritizes action to deliver on programs/projects, outlines further consultation required, and provides estimates of the resources and timelines involved

VII. A reporting and monitoring protocol, and a mechanism for how the plan will be updated to reflect the results and timing for updates.

7. Implementation of the Plan

Streamlining implementation is one of the major opportunities of an integrated plan. Implementation will involve further consultation with stakeholders, educating the community about the benefits of the plan through a variety of mediums, and the technical/administrative work to implement projects and programs. This will require investment by the community for staff resources, consultants, capital infrastructure, and program delivery. Opportunities should be sought where this investment can deliver multiple benefits to the community.

Implementation of an integrated plan will likely include a series of fairly discrete projects and programs, not all of which deliver integrated benefits on their own. How these are promoted depends again on the community's priorities and interests. Portland's experience has demonstrated that measures can be successfully packaged under a number of different labels that appeal to the community's interests (not always air quality-related).

8. Reporting, Evaluation, Adaptation and Plan Updates

It is important that the municipality's commitment to measuring and reporting is realistic, affordable and useful for evaluating the implementation phase. While a community must often comply with either provincial or federal monitoring and reporting requirements, resourcing and time must remain focused on plan implementation. A municipality should work with the more senior governments to identify the most efficient and effective approach to monitoring and reporting, dovetailing with other reporting requirements where possible. Monitoring will require an on-going comparison of air quality and energy cost/reliability. The results should be reported in a way that is consistent with requirements and allows comparison of the different benefits.

4.2 Other Considerations and Recommendations for Local Governments and First Nations

This section outlines some additional considerations for municipalities undertaking either a fully integrated plan or one of the three air quality-related planning processes.

4.2.1 Use either an "Integrated" or "Complementary" Planning Approach.

As noted earlier, an integrated approach is not appropriate for all communities and the path taken to air issues planning will have to be tailored to each community's unique set of circumstances, priorities and resource capacity. Therefore, it is acknowledged that in some cases, air quality, GHG and energy planning processes (or at least parts of those processes) will continue to be undertaken as separate exercises. However, if this is the case, the processes can be conducted in a way that is complementary and reduces the duplication of resources. Whichever process is initiated first, and even if an integrated process is not pursued, there will be the opportunity to consider the core issues of the other air issues plans.

CEP and GHG plans are clearly compatible, and CEPs may consider air quality and GHG issues without developing full GHG or air quality management plans. There will be few circumstances where it does not make sense to pursue CEP and GHG emissions reduction plans together as an integrated plan. The different drivers and requirements for air quality planning mean that it will be fully integrated with GHG plans and CEPs only in certain circumstances (most often where fossil fuel consumption dominates air emissions (e.g. Whistler)).

4.2.2 Focus on Managing Resources Rather Than Reducing Emissions.

Air emissions have traditionally been managed through end of pipe solutions for larger point source polluters. These point sources fall under provincial jurisdiction. As area sources, which fall under both senior and local government jurisdictions, become more important there is the opportunity to refocus the issue on "managing resources", through measures such as energy efficiency improvements or pollution prevention analysis. This more positive approach avoids the negative "finger pointing" at any one particular polluter or group and expands the opportunities for an integrated approach.

4.2.3 Ensure CEPs Are Carried Out in a Way that is Compatible with PCP Protocol.

Communities that are members of the Partners for Climate Protection (PCP) Program should ensure that a Community Energy Plan satisfies at least Milestones 1 and 3. Satisfaction of the Protocol requires a two track analysis for corporate (municipal facilities) and community emissions for Milestone 1 (inventory) and suggests separate corporate and community plans for Milestone 3 (action plan).

4.2.4 Incorporate into Other Municipal Planning Documents.

Incorporating energy and emissions planning measures into planning documents with regulatory weight (such as an OCP) is more likely to result in concrete action (Quesnel, Kamloops). Some types of municipal plans are regularly updated (such as an OCP every 5 years or so), while some are sector or issue oriented and may be updated less often (such as transportation or infrastructure plans). Energy or emissions issues can be integrated into many municipal plans and strategies, and at times, the creation of these plans can be a great stimulus to address energy and air quality.

A good example is a transportation master plan which can be used to address fuels, emissions, energy consumption, transit, and many other related issues over the long term. Progressive solutions within a comprehensive transportation plan will go a long way toward addressing energy and emissions issues that will be raised in an integrated air issues planning process.

4.3 Recommendations for Senior Government Roles in Integrated Air Quality-Related Planning Processes

This section identifies five categories of recommendations for the role of senior (provincial and federal) governments to facilitate integrated air quality related planning. Only a synopsis is presented here. More detailed recommendations can be found in Appendix E.

4.3.1 Establish a Supportive Environment for Integrated Air Quality-Related Planning

Perhaps the most important role for the provincial (and federal) government is to establish a policy and regulatory environment in which an integrated air quality-related planning process makes sense to local communities including:

- Harmonizing air quality, climate change and energy policy;
- Requiring long-term planning;
- Establishing/clarifying regulatory requirements including:
    - Seeking clarity on how GHGs relate to the *Waste Management Act* (and new *Environmental Management Act*) would also assist in promoting integrated planning;
    - Encouraging the incorporation of an integrated approach to air quality, GHGs and energy into the Official Community Planning (OCP) process and other broader municipal plans; and
    - Establishing minimum requirements for energy efficiency in the Provincial Building Code and allowing municipalities to require higher standards of efficiency in their local building codes.

4.3.2 Directly Assisting Municipalities to Undertake Integrated Air Issues Planning (Technical Capacity):

- Developing integrated air issues templates and technical standards;
- Continuing MWLAP's important technical support role in planning processes;
- Assisting in developing energy project/utility-related capacity;
- Enabling data access (through utilities, ICBC);
- Providing a one-window information centre; and
- Establishing measurement and reporting protocols.

4.3.3 Work with Industry and Other Partners

The sources for many emissions in smaller communities can be resource industries, so many solutions lie in establishing and maintaining partnerships with these industries. The combination of local government and industry resources and tools can be effective. This could involve:

- Assisting resource industries to participate in CEP and integrated planning with communities through:
  - Tax and other incentives;
  - Training programs and educational initiatives for key industry staff;
  - Communication and promotion to industry and business associations; and
  - Enabling discussions between municipalities and industrial sectors (e.g. provide chair/ mediators/ negotiators/ facilities for discussions).
- Working with utilities to expand demand side management programs and to encourage them to provide needed inventory data;
- Working with ICBC to establish new insurance classifications for new types of vehicles such as Segways; and
- Establishing partnerships with program delivery agents.

4.3.4 Increase Financial Capacity and Affordability

The provincial and federal governments could develop funding mechanisms or tools that further assist local governments and First Nations in the financial aspects of planning and implementation. This might include:

- Developing revolving funds;
- Facilitating bulk purchase agreements for energy equipment;
- Providing a consultancy service to small communities;
- Providing direct funding to municipalities:
  - to hire an Energy and Emissions Manager;
  - for program support;
  - for community infrastructure;
  - for community transit; and
- Supporting aggressive promotion and related incentives for home energy audits and retrofits.

4.3.5 Combined Provincial/Federal Initiatives

A number of initiatives are best undertaken jointly between the provincial and federal governments and their respective agencies. These could include:

- Coordinating data/ reporting requirements of municipalities;
- Providing access/information about federal programs through provincial web sites;
- Reviewing federal tax policy for disincentives;
- Increasing both fuel efficiency and emissions standards for all vehicles and off-road engines;
- Reviewing fuel and emission standards for marine vessels;

- Promoting clean and bio-based fuels; and
- Recognizing good work through awards and profiles.

4.4 Next Steps

The planning framework, recommendations and options outlined in the previous sections are intended as the basis for a discussion regarding how communities might approach a more integrated air quality-related planning process as well as how the Provincial and Federal Governments could support and encourage such an approach. The Union of British Columbia Municipalities (UBCM) is an invaluable stakeholder in supporting integrated planning at the local government level. The following steps should be contemplated in collaboration with, and refined based on subsequent direction from, UBCM:

- **Conduct a high level screening** to determine the number of communities that meet the conditions for an integrated approach. This will establish the potential return-on-investment for the Province's efforts in promoting an integrated approach;
- **Discuss the series of options** noted above and prioritize to create a common province-wide approach (this step could be undertaken within a results-based management framework to identify how key activities and their outputs link to desired outcomes of integrated air issues planning). This should include:
    - Establishing dialogue with other provincial ministries and other government agencies (at federal and local level) to discuss the promotion of an integrated approach and to identify harmonization opportunities and alignment of policies and regulations; and
    - Develop presentations to discuss an integrated approach with key stakeholders;
- **Identify resources** that may be made available to the program. Resources consist of both long-term core funding (to provide the program's foundation) and "opportunistic" project-based funding (to promote specific program activities). These might include:
    - Developing programs and incentives that could be used to encourage local governments and industry partners to undertake an integrated approach;
    - Developing information resources such as an integrated study manual/methodology; and
    - Training MWLAP staff to be attuned to harmonized benefits.

5 REFERENCES

References specific to the case studies are listed after each case study in Appendices B and C.

BC Climate Change Economic Impacts Panel. Report of the BC Climate Change Economic Impacts Panel, March 2003, prepared for the Minister of Water, Land and Air Protection and Minister of Energy and Mines. http://wlapwww.gov.bc.ca/air/climate/bc_clim_chng_pln_%20pdfs/ccei_report.pdf)

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GVRD/FVRD. 2000 Emissions Inventory for the Canadian Portion of the Lower Fraser Valley. November 2003.

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Hyla Environmental Services. *Municipal Sustainability Plan: A Guidance Document for the Development of a Greenhouse Gas Emissions Reduction Plan.* Prepared for Federation of Canadian Municipalities. Undated. Available from: http://kn.fcm.ca.

APPENDIX A: OVERVIEW OF AIR QUALITY-RELATED PLANNING PROCESSES

A.1 Air Quality Management Planning

Definition and Goals

An airshed is a geographic area where air quality is influenced by similar emission sources, meteorology and terrain features. Airshed or air quality management planning is an area-based process that strives to improve air quality by reducing the emission of common contaminants within an airshed. Contaminants of common concern include:

- Particulate Matter (PM_{10} and $PM_{2.5}$);
- Nitrogen Oxides;
- Carbon Monoxide;
- Sulphur Oxides;
- Volatile Organic Compounds;
- Secondary pollutants such as Ground level Ozone; and
- Other toxic substances.

Air quality or airshed management plans (AQMPs) are undertaken to develop common approaches to addressing air quality problems. Supporting information needed for AQMPs include a good understanding of the common sources of air contaminants, and the cumulative effects of those contaminants within the airshed. The key drivers for air quality management plans are: the reduction of human health impacts, environmental quality protection and mitigation of visibility impacts resulting from air pollution in the local airshed.

Regulatory Framework - Air Quality Monitoring and Planning

The Ministry of Water, Land and Air Protection (WLAP) has primary responsibility for air management in the province of British Columbia (BC). Although there are currently no regulatory requirements, the new *Environmental Management Act (EMA)* will give the minister the authority to require area-based planning where deemed necessary.[22] The EMA has been given royal assent and is expected to be proclaimed in the spring of 2004.

Standards for various air pollutants have been established at the national, provincial and regional (GVRD) levels:

CCME Canada-Wide Standards (CWS) (to be achieved by 2010):

- PM2.5: $30\mu g/m^3$, 24 hour average - achievement based on annual 98th percentile averaged over 3 consecutive years by 2010.
- Ozone: 65 ppb (parts per billion) – achievement based on annual 4th highest daily 8h maxima, averaged over 3 consecutive years.

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[22] http://legis.gov.bc.ca/37th4th/3rd_read/gov57-3toc.htm

National Ambient Air Quality Objectives

Exhibit A-1: National Ambient Air Quality Objectives & Guidelines.

Pollutant	Averaging Time	Maximum Desirable Level	Maximum Acceptable Level	Maximum Tolerable Level
Sulphur dioxide (SO_2)	annual 24 hours 1 hour	11 ppb 57 ppb 172 ppb	23 ppb 115 ppb 334 ppb	--- 306 ppb ---
Total Suspended Particulate (TSP)	annual 24 hours	60 µg/m3 ---	70 µg/m3 120µg/m3	--- 400 µg/m3
Carbon Monoxide (CO)	8 hours 1 hour	5 ppm 13 ppm	13 ppm 31 ppm	17 ppm ---
Nitrogen Dioxide (NO_2)	annual 24 hours 1 hour	32 ppb	53 ppb 106 ppb 213 ppb	--- 160 ppb 532 ppb
Ozone (O_3)	annual 24 hours 1 hour	--- 15 ppb 51 ppb	15 ppb 25 ppb 82 ppb	--- --- 153 ppb

Source: Health Canada - http://www.hc-sc.gc.ca/hecs-sesc/air_quality/regulations.htm#3

Provincial Standards

- PM10: Maximum Acceptable 24 hour average of 50 µg/m3[23]
- Formaldehyde: One hour average concentration:
    - Action level - 60 µg/m3
    - Episode Level - 370 µg/m3[24]

Regional (GVRD) Objectives

The GVRD has established ambient air quality objectives for total reduced sulphur and inhalable particulate matter. These were developed by the GVRD because no applicable limits have been defined (by the other bodies) in the region.

Tools

Tools used by the province to manage air quality include regulations, permits, fees, emission guidelines, air quality monitoring, emission inventories, air quality modeling, development of air quality objectives and emission standards, and public education and information. These activities also contribute to British Columbia's obligations under federal legislation and several international agreements.[25]

The Federal Government, through Environment Canada, is responsible for regulating motor vehicle emissions through standards for new vehicle performance and fuel composition. The province supports airshed planning as a tool to meet its commitments under the CCME Canada-wide Standards for PM and Ozone, including provisions for Continuous Improvement and Keeping Clean Areas Clean. The provincial government works closely with municipalities and regional districts to develop airshed management plans under a principle of shared stewardship.

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[23] This is an interim standard prepared by the Province while the National Standard is being prepared.

[24] MWLAP website - http://wlapwww.gov.bc.ca/epd/cpr/objectiv/aqoffp.html

[25] source: Particulate Monitoring in British Columbia, *http://wlapwww.gov.bc.ca/air/particulates/pdfs/pmreport.pdf*

The provincial *Waste Management Act* gives the Greater Vancouver Regional District (GVRD) authority to manage air emissions in the Greater Vancouver Urban Area. The GVRD also passed the GVRD Air Quality Management Bylaw which is administered by its source control emissions branch. The Fraser Valley Regional District has been given authority for air quality planning and monitoring through an Order-in-Council.

Process Overview

In general, AQMP's include the following steps:

- Identification, measurement, and monitoring of common air pollutants to establish whether or not air quality complies with standards;
- Determine the relative contribution of different air pollutants to air quality issues;
- Conduct detailed inventory to identify sources of pollution;
- Conduct modeling to determine current and potential future air quality scenarios;
- Develop strategies to reduce air pollutants impact on air quality;
- Establish stakeholder priorities and concerns as related to pollution sources;
- Analysis of potential solutions to reduce impacts, including cost-benefit analysis;
- Establish ambient air quality targets; and
- Represent stakeholder values by jointly developing solutions to achieving goals through the adoption of an AQMP.

Inventory / Analysis Methodology

Generally, AQMP information needs include ambient and source (such as stack emissions) condition monitoring or estimation. Estimates are made using the following methods:[26]

- **Monitoring Data:** A preferred method that includes sampling and measuring directly at the source. Discrete (stack) samples are used to determine composition and quantity of emission whereas ambient monitoring samples are used to determine air quality conditions at distances from the source. Ambient samples are often used to verify airshed modeling results.
- **Material Balance Calculations:** A method of estimating source emissions, which considers the amount of material entering a process and the amount consumed by the process to estimate the waste material released as a result of the process.
- **Emissions Factors:** An emissions factor is a ratio that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the emitting process.
- **Published Equations and Models:** Accepted emission equations or models are used for source emission estimation as well as ambient airshed condition estimation.
- **Permit Parameters:** Substances controlled by permits can be set at a specified maximum discharge concentration, for a given flow rate and hours of operation. Other operational conditions or release limits, for both normal conditions and upset conditions, may be specified in air permits. Permit parameters may also include ambient concentrations, for example at a facility fenceline. Permits issued by the BCWLAP and the GVRD may also provide the maximum allowable annual mass emission rate.

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[26] 2000 Emissions Inventory for the Canadian Portion of the Lower Fraser Valley Airshed, p. A-2-3

Participating Communities in British Columbia

Currently, seven local governments in British Columbia have or are completing an AQMP. Others are in the preliminary stages of developing an AQMP.

- Greater Vancouver Regional District
- City of Quesnel
- Williams Lake
- Prince George
- Fraser Valley Regional District
- Bulkley Valley – Lakes District
- Resort Municipality of Whistler

A.2 Climate Change – Greenhouse Gas Action Plans

Definition and Goals

In spite of increasing scientific evidence that climate change is, at least partially, human induced, the causal relationship between greenhouse gas (GHG) and climate change remains a controversial topic for industry groups, governments, communities, and even individuals. However, it is an undisputed fact that fossil fuel combustion creates greenhouse gases such as carbon dioxide and nitrous oxide. Methane, another GHG, is a by-product from decomposing organic waste in landfills. The Government of Canada and the Federation of Canadian Municipalities (FCM) have committed to assisting Canadian municipalities in their efforts to reduce GHGs through their Partners for Climate Protection (PCP) process. The goal of the PCP is to assist communities to reduce GHGs and save money, develop a sustainable community, slow climate change, and prepare for the carbon trading future. Reductions in GHGs are expected to be achieved through land-use, energy and transportation planning, infrastructure design, green procurement, building retrofits, water conservation, solid waste diversions, and renewable energy.

The key driver for greenhouse gas emissions reduction plans is the mitigation of global climate change.

Municipal Green House Gas Action Plans aim to reduce emissions of the following greenhouse gases:
- Carbon Dioxide;
- Nitrous Oxide; and
- Methane.

Industrial GHG plans may target other less common GHG substances, depending on process or product releases.

Regulatory Framework

There is currently no regulatory requirement to undertake greenhouse gas action plans in Canada. However, the Government of Canada is a signatory to, and has ratified, the Kyoto Protocol. Canadian municipalities enter the PCP program voluntarily. However, becoming a member can only occur through a municipal council resolution.

Process Overview

The PCP includes a five 'milestone' framework. A participating community can implement milestones in the order prescribed by the FCM or in an order that suits their needs. For instance, many communities have begun by completing a greenhouse gas inventory, while others have moved immediately to actions aimed at reducing GHG emissions.

Briefly, the milestones include the following tasks:

1. **Milestone One - Creating a GHG Emissions Inventory and Forecast:**
    - Community and corporate inventory of energy use and solid waste generation for estimation of GHG emissions
    - Forecasting of future emissions based on population, economic growth and fuel mix assumptions
2. **Milestone Two - Setting an Emissions Reduction Target:**
    - Typically includes community and stakeholder consultation
    - Council adoption of GHG reduction target
3. **Milestone Three - Developing a Local Action Plan:**
    - Envisioned as a strategic document outlining how a community will achieve its GHG emissions reduction targets covering community activities and corporate operations

- Municipalities are encouraged to generate an action plan for corporate operations to demonstrate leadership.
- Community level action plans require input and coordination from many stakeholders, such as citizen groups, the private sector, and non-governmental organizations.

  Actions include:
  - Establish a formal organizational structure
  - Review data
  - Identify sector-specific GHG targets
  - Consider emissions sources

4. **Milestone Four - Implementing the Local Action Plan:**
   - Program management required and includes:
     - Staffing and communication
     - Financing and budgeting
     - Project timelines
     - Stakeholder engagement
5. **Milestone Five - Monitoring Progress and Reporting Results:**
   - Monitoring progress, reporting results, realizing goals define the key activities and tasks.

Inventory / Analysis Methodology

As described above, the inventory of greenhouse gases is completed in Milestone One. The community inventory considers residential, commercial, industrial, transportation and waste energy consumption data while the corporate inventory considers energy consumed by local government operations in buildings, street lighting, water and wastewater, fleet vehicles and corporate waste. Energy consumption data (energy or volume units) is used to determine the mass of GHG generated and is converted to equivalent CO_2 (e CO_2) for ease of comparison. The PCP Protocol provides a set of guidelines for PCP communities, and the CCP software developed to assist in the inventory and scenario projections, can be used when undertaking GHG emissions inventories. Some municipalities have also developed custom or simplified models, typically using spreadsheet tools to inventory and estimate emissions.

Participating Communities in British Columbia

Currently, 39 municipal governments in British Columbia belong to PCP.[27]

- Abbotsford
- Anmore
- Belcarra
- Burnaby
- Bowen Island
- Central Okanagan Regional District
- Central Kootenay
- Coquitlam
- Delta
- District of Mission
- Greater Vancouver Regional District
- Hudson's Hope
- Invermere
- Langley (City of)
- Langley (Township of)
- Lions Bay
- Kamloops
- Kelowna
- Maple Ridge
- Mission
- New Westminster
- Nanaimo
- Nanaimo (Regional District)
- West Vancouver
- City of North Vancouver
- District of North Vancouver
- Pitt Meadow
- Port Alberni
- Port Coquitlam
- PrinceGeorge
- Port Moody
- City of Quesnel
- Richmond
- Saanich
- Surrey
- Vancouver
- Victoria
- Whistler
- White Rock

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[27] www.kn.fcm.ca

A.3 Community Energy Planning

Definition and Goals

The Community Energy Systems Group from Natural Resources Canada defines a Community Energy Plan (CEP) as: A CEP takes a long-term and high-level look at the community's future from a system's perspective. It examines the development of the community, and the cost of living within it. It aims to increase the quality of life through the efficient use of energy and utilization of local and/or sustainable energy supplies.[28] The BC Community Energy Association expands on their definition and includes the consideration of energy supply and demand in urban, regional and neighbourhood design and development, land use and transportation planning, site planning, and building design, infrastructure design and efficiency and alternative energy supply options.[29] The Pembina Institute, a not-for-profit environmental policy research and education organization, aims to drive community policy and economic development as it relates to energy and to influence investment in community energy facilities through their work with communities on energy planning.[30]

The key drivers for CEPs are economic development through greater self-reliance and technological innovation, and reduced energy costs. Reduction in greenhouse gas emissions and common air contaminants is also frequently cited as a goal of CEP.

Regulatory Framework

There is currently no regulatory requirement to undertake Community Energy Plans in Canada. Similarly, the results of a CEP process carry no legal authority without further measures to incorporate the results into the municipal regulatory process. However, through community wide agreement, a CEP can be used to form an over-arching guide for action.

In British Columbia, several agencies offer services to undertake CEPs and provide information resources to assist in this regard, including the BC Community Energy Association (formerly BC Energy Aware Committee), the Pembina Institute and ICLEI . The Pembina Institute also offers fee for service planning services as do private consulting firms and ICLEI.

Process Overview

Planning processes generally reflect the community's needs and resources. The BC Community Energy Association (CEA) provides three approaches to community energy planning. Briefly, they are:

- **Single Issue Energy Plan:** A single energy-related issue which becomes a catalyst for local involvement in energy planning.
- **Comprehensive Energy Plan:** Typically carried out when energy issues are significant.
- **The Energy Component Approach:** CEP takes the form of a component or 'add-on' to broader community planning processes such as regional growth strategies, official community plans, a neighbourhood concept plan, or site design.

The CEA offers a model for the CEP planning process, which includes the following steps:

- **Build the energy team:** Active members are chosen and largely depend on the scope of the plan.
- **Clarify community goals:** Goals should compliment and build on existing priorities set out by other planning processes.

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[28] Community Energy Planning - A Guide For Communities. Draft Version 2. Http://Kn.Fcm.Ca/Ev.Php?URL_ID=3055&URL_DO=DO_TOPIC&URL_SECTION=201&Reload=1075930334. 2/4/2004

[29] A Tool Kit for Community Energy Planning in B.C. – An Introduction (Volume 1). 2001. p. 2

[30] The Pembina Institute Home Page, http://www.pembina.org/. 2/4/04

- **Draw the energy profile:** Determine energy consumption and associated costs for the region, community or neighbourhood. At this stage, a broad understanding of collective impacts is preferred over precise calculations.
- **Take the message to the community:** Current costs for energy services inform the benefits for an alternate approach.
- **Identify energy opportunities:** Identify stakeholders, such as utilities, large energy consumers, business representatives, resident associations, government agencies, developers, independent power producers, etc., who will be crucial to the implementation of the plan. Carry out research and develop a work plan that respect the concerns raised by stakeholders and identify opportunities that address issues that the community faces.
- **Create planning options:** Development of alternatives to evaluate and compare. Ideally, trade-offs are considered at this point.
- **Evaluate and select a preferred plan/approach:** Alternatives are evaluated against community goals.
- **Make an action plan:** Resources are allocated to form an implementation plan. Strive to gain commitments from groups or individuals to lead initiatives. A communication plan should be included.
- **Monitor the results:** Define 'indicators' to measure progress towards goals. Assign reporting responsibilities and determine frequency of reports, updates and or data collection.
- **Evaluate alternative development scenarios:** As new opportunities arise, evaluating alternative development scenarios will assist stakeholders in choosing an efficient development scenario.

Inventory / Analysis Methodology

Approaches vary and largely depend on the scope of the process and the scale of the planning unit. Early data collection generally considers geographic boundaries and planning goals since data collection can seem limitless. Since the essence of CEP is to affect bulk energy supply, demand and generation in the community, there is little emphasis on precise data in the early stages. As goals or strategies evolve, higher levels of detail are investigated and collected by team members and stakeholders.

In general, inventory and analysis methods for CEP process data collection take the form of:

- Estimation of community wide energy consumption through 'back of the envelope' calculations available from surveys or readily available statistics[31];
- Estimation through computer software modeling programs;
- Development of a list of sector- or fuel source-specific estimates.

Challenges & Observations

Plans, regardless of process, form, or topic, generally face the same challenges. Lack of ownership, unclear or unassigned responsibilities, insufficient regard for existing plans, and/or changing actors are common problems that lead to few results.[32] CEP and associated processes also suffer from 'misunderstanding' of intentions and focus by stakeholders and the general community.[33]

Participating Communities in British Columbia

Currently, at least 13 local governments and First Nations in British Columbia have or are completing a CEP or a CEP-related process.

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[31] Some CEPs have begun to develop more detailed inventories using an approximation of the PCP protocol. (Quesnel, Bowen Island).

[32] City of Kamloops – Community Energy Planning, A Tool Kit for Community Energy Planning In BC, Case Studies (Volume 3), p. 30

[33] ibid

- Municipality of Bowen Island
- Regional Municipality of Whistler
- City of North Vancouver
- Hupacasath First Nation
- Nemiah Valley (Xeni Gwet'in First Nation)
- Port Douglas / Tipella (Douglas First Nation)
- Greater Vancouver Regional District
- City of Vancouver
- City of Kamloops
- City of Quesnel
- Hartley Bay (Gitga'at First Nation)
- Rivers Inlet (Oweekeno First Nation)
- Kyuquot (Kyuquot/Checkleseht First Nation)

APPENDIX B: CASE STUDIES IN BC

B.1 Case Study: Bulkley Valley – Lakes District (BVLD)

1. Background

Summary: Air Quality Initiative

Air Quality Management Plan A) Standalone Plan B) Comprehensive

The Bulkley Valley - Lakes District includes the communities of Smithers, Burns Lake, Houston, Telkwa and New and Old Hazelton in central British Columbia. Elevated particulate levels resulting from still air conditions and various emissions including land clearing debris burning, beehive burners and domestic wood stoves, road dust, industrial stack emissions including a panel board plant and other regulated emissions (asphalt plant) mean that the communities often suffer poor air quality episodes at various times during the year. This has led to concerns of health impacts as well as impacts on the tourism industry, in part due to poor visibility.

Early grass roots work commenced in the late 1980's and airshed management planning has been ongoing in the Bulkley Valley - Lakes District since 1992. The Ministry of Water, Land and Air Protection currently maintains continuous air quality monitoring in Burns Lake, Houston, Telkwa, and Smithers, and non-continuous monitoring in Hazelton and Kitwanga. The 1999 revision of the Bulkley Valley Air Quality Management Plan is serving as the basis for the 2003/2004 airshed management planning process currently being undertaken. However, this is a brand new plan not a revision, and the scope of the new plan is different and in many ways the communities are starting from scratch. Geographically the scope is wider than previous studies (includes from Kitwanga in the West to Endako in the East) and it includes examination of PM2.5, in addition to PM10. The plan was completed in March 2004. The previous plans involved much less input from community/industry and were predominantly focused on efforts that fall within the jurisdiction of MWLAP. The current plan has a much broader scope and involves a wider range of measures including those that involve co-operation from multiple stakeholders.

Summary of Work Plan with Major Deliverables and Deadlines (From BVLD AMP Work Plan and Community Outreach Strategy).

1. Goals and Indicators by emission source/endorsement by selected BC scientists - Sept.30/Oct.30, 2003
2. Draft Table of Contents and Template for BVLD Plan (requires RWG meeting) - October 30, 2003
3. Final Table of Contents and Template for BVLD Plan - November 5, 2003
4. Draft Plan for working group input (requires RWG meeting and 3 rounds of CWG meetings) - January 31, 2004
5.Community Outreach activities to build up interest for February presentations Oct 1, 2003 - Feb 28, 2004
6. Community Input on Plan – Presentations to local governments - Feb 28, 2004
7. Final Plan - March 26, 2004
8. Dispersion Modeling Iterations of various emission sources - ongoing
9. Establishment of Implementation and Monitoring Team – CWGs and RWG to remain in place March 31, 2004
10. Revisions to Website for Implementation of Plan - April 23, 2004
11. Begin 5 year implementation May 2004

Triggers

A year of WLAP consultation with 'public' to discuss air quality issues led up to the commencement of process. An Environmental Appeal Board (EAB) hearing regarding the (Waste Management Act) permitting of beehive burners in the area also stirred local interest. The EAB Panel ruled that it is reasonable for MWLAP to set objectives for different Airsheds in the province and that a threshold for air quality episode management of 25 g/m^3 PM10 was reasonable and appropriate for Bulkley Valley Airshed.

Visibility issues have presented problems for air charter operators (outfitters) who rely on visible navigation rather than instrumentation. There have been numerous cases of outfitters having to turn back or re-route because of poor visibility caused by smoke.

Champions

A process facilitator was hired to provide support services for a Coordinating Committee appointed by WLAP. The Coordinating Committee consisted of citizens, local governments, and environmental groups from the various Valley communities. (See Planning, Organization, Funding). CHOKED (a local organization advocating for improved air quality) was an early champion and catalyst for action. They organized demonstrations outside Town Hall and local saw mills, with a special focus on beehive burners. This group instigated the appeal to the EAB). Members of CHOKED were used as a focus group in the formative stage of planning.

Local forest companies have also been champions and have contributed to instrumentation and paying for staff positions for monitoring. Individual staff at MWLAP are also important champions of this initiative and it is likely that the AMP initiative would not have proceeded without them. Air quality has been made a high priority by the regional office.

Linkages with Existing Municipal Policy/Initiatives

Linkages with municipal policy were accomplished through ensuring that two mayors were part of an advisory committee. In addition, both paid and elected local government officials belonged to some of the CWGs. The plan now contains strategies specific to local government jurisdictions and capabilities. This includes the use of municipal bylaws, the use of zoning restrictions in OCPs and partnering opportunities related to public education on air quality. A regional Woodstove Changeout Program was initiated during the AMP process.

Senior Government Legislation that Influenced the Process

The findings of the Environmental Appeal Board (under the BC Waste Management Act) that particulate matter discharged from beehive burners does impact air quality in the Valley and that discharged particulate matter has an adverse effect on the environment and human health heavily influenced the AMP process. Difficulties in enforcing the Open Burning Smoke Control Regulation of the Waste Management Act, and an absence of regulatory instruments governing domestic woodstove use and open burning lead to the use of the consensus approach of the plan.

2. Planning, Organisation and Funding

Planning process (includes three phases)

- Phase 1: The Co-ordinating Committee (CC) prepared background materials and pursued membership recruiting for the Community Working Groups (CWGs) through Open Houses, media relations, and direct invitation (by March 31, 2003). The CC was disbanded after Mar 31 2003, when the CWGs began their planning process.
- Phase 2: This phase included identification of community and regional air quality management issues and available scientific information. If necessary, identify the need for new scientific data. Data collection started with a "Community Emissions Inventory" (less scientific but using local knowledge. This has proved to be fairly accurate and achieved a high level of early "buy-in" to the process. The organizers didn't want to wait for more accurate emissions data to be in place for fear that they would lose momentum).
- Phase 3: Develop and finalize a Regional Airshed Management Plan that identifies improved methods of managing major sources of fine particulate air pollution.

Key Staff / Committees

The BVLD process began with WLAP hiring of a part-time facilitator in order to provide support services to a Coordinating Committee.

The Coordinating Committee represented the general public, industry, government, and non-profit groups and was charged with two tasks:

1. Develop background information to support the drafting of a new Regional Airshed Management Plan.
2. Recruit members for Community Working Groups from which a Regional Working Group can be formed.

An Advisory Committee (formed after CC disbanded) is intended to provide an oversight function. It represents the interests of provincial and local levels of government and industry who are supporting the planning process and to provide advice on implementation matters. Members are responsible for:

- Providing advice to the Coordinating Committee regarding the feasibility of the proposed plan components;
- Identifying and helping to secure funding for plan components.

Members included Mayors of Smithers and Houston, a local mill Manager, and MWLAP Regional Waste Manager.

Four Community and Regional Working Groups are responsible for the planning work in each area. The regional working group is made up of representatives from each of the 4 CWGs.

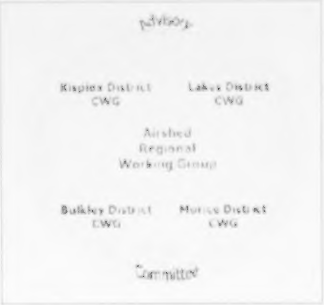

Figure 1 – BVLD Airshed Management Plan advising committees and their relationships.

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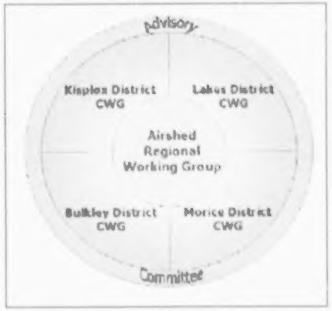

Figure 1 - BVLD Airshed Management Plan advising committees and their relationships

In addition, two sub-committees of the regional working group were formed to address specific emissions of Road dust, and resource management burning (land clearing debris burning).

Every month, CWGs meet, discuss local planning issues and where appropriate, suggest issues for discussion at future RWG meetings. The RWG develops recommendations and meets as often as needed.(approx once per month).

Community Consultation
There is significant community interest in dealing with this issue. It is controversial because it is a resource issue and this is an area heavily dependent on resource extraction. A Community Outreach Plan was drafted for approval by all of the CWGs.

Target Audience:
- Public (homeowners – specifically those using wood heat; drivers, consumers)
- Affected local governments (First Nations, Municipalities, Regional Districts)
- Farmers, cattlemen, ranchers
- Woodlot owners and forestry contractors
- Foresters – industry and government
- Contractors generating waste that may be burned (land clearing, construction)
- Individuals and community groups expressing interest in air quality and resource recovery
- Enterprises offering clean heating systems and air quality/climate friendly products and services
- Other jurisdictions and agencies with similar mandates (i.e. LRMP tables, Amenity Migration project, Community Futures)
- Internal – project team members, front line staff likely to field questions on Plan development
- Fire Departments
- Children and Youth (school age)
- Media

Communications tools:
- Website www.bvldamp.ca (very positive feedback)
- Community Contact (i.e. monthly CWG meetings, workshops, letters, presentations, individual phone and office contacts etc)
- Newspaper articles (press releases, contributions and interviews)
- Radio stories (press releases, PSAs and interviews)
- Printed materials (brochures etc.)
- Displays
- Monthly Airshed Update (interested but can't commit e-mail list)
- Posters
- Point-of-sale materials (wood burning appliances, lawn mowers etc.) – nothing yet.

Also, General public invited to all CWG and RWG meetings. Input was solicited at these meetings when draft plans and/or initiatives were being finalized. Included a wisdom circle where community members can tell their stories.

Costs/Funding
While the planning process was being established, MWLAP contributed $37,000 to developing the Bulkley Valley - Lakes District Airshed Committee.. An additional $14,000 was contributed for the Bulkley Valley - Lakes District Emission Inventory Recommendations, which developed options and recommendations in the collection of accurate and up-to-date emissions inventory for fine particulates specific to the Bulkley Valley-Lakes District Airshed. $25,000 was also provided by MWLAP for modeled meteorological data to be used as input for the dispersion model for airshed-management purposes.

The following 12 month planning process was funded under a $211K partnership funding arrangement, including $40K for the North American Fund For Environmental Cooperation, $143K from WLAP, $25K from 7 forest licensees and $3K from the BC Lung Association. This purchased facilitation services, micro-emission inventory information using an auxiliary employee within MWLAP, public education, planning venues and infrastructure and air quality dispersion modelling. In addition to this, MWLAP has contributed 1.2 person years of staff time.

The 5 year implementation phase is projected to cost $20,000 per year, under a partnership funding arrangement.

3. Data Gathered (inventory and baseline)

Data Needed to Plan the Program
An Air Quality Summary and Assessment for Bulkley Valley – Lakes District (Levelton Consultants Ltd.) was completed in March, 2002. This study reviewed and summarized air

quality and meteorological data from 1997 – 2001 collected from four monitoring stations. The monitoring stations are Burns Lake Fire Centre, Houston Firehall, St. Josephs School in Smithers and Telkwa Fire Hall. The study attempted to provide possible links between sources, local knowledge and ambient air quality for the BVLD region. This study wasn't officially part of the AMP process but the information was a prerequisite to progressing with the plan.

Data collected for the above study included:

- Percent data capture for the period of monitoring as well as for the year
- Percent exceedances of air-quality thresholds
- Exposure on an annual basis for the communities reviewed in the report were calculated using the method described for the "lowest observed adverse effect level (LOAEL)" in the Addendum to the Science Assessment Document for the National Ambient Air Quality Objectives for Particulate Matter.
- Air quality trends in each community
- Meteorology
- Source Contributions

The 2000 Provincial Emissions Inventory has been used as the starting point for most emissions and this is refined through more detailed analysis in the micro-emissions inventory.

An auxiliary has now been hired for 12 months to assist in detailed inventory data acquisition including burning and operating schedules. (50% industry funding, 50% MWLAP funding).

Modelling

2001 and 2002 meteorological modelling is being completed and will be combined with the inventory data to perform dispersion modelling. This will be useful in "filling the gaps" in data around fine particulates as there are only four monitoring stations in the entire area. Dispersion modelling will become an ongoing tool in optimizing emission source reduction strategies.

Challenges

- Initially there were many preconceptions about emission sources and the priorities for addressing these.
- Equipment limitations (e.g. # of monitoring stations for fine particulates) for demonstrating # of air quality episodes.
- Most people aware that poor air quality is an issue but many people surprised about # of poor air quality days.
- It has been important to understand that there are a combination of emission sources and all these need to be addressed.
- Woodstoves – provincial survey. Majority of heating is woodstove. Natural gas getting expensive so people reverting to wood leading to further degradation of air quality.
- Monitoring station locations have been an issue – i.e. monitoring station is located close to highway- may be giving biased readings.
- There has up to now been a focus on PM10. However, MWLAP is now looking at co-locating more PM2.5 instruments with existing PM10 and meteorological equipment.
- There is a significant contribution from smaller (non-permitted) industrial and forest operators. It has been a challenge to estimate contributions for these multiple sources.
- Road dust is challenging to estimate.

4. Implementation and Results Achieved

The plan focuses on the 6 major sources of PM that have been identified in the communities:

1. Beehive burners
2. Forest harvest burning
3. Agricultural and land clearing burning
4. Wood burning for residential heating
5. Residential (backyard) burning
6. Road dust

Strategies include:

- Supporting a proposal for a co-generation plant that will replace up to 4 beehive burners (2 Tier 1 burners in Houston, 2 Tier 2 burners in the Burns Lake area)
- Reducing the amount of resource wood waste that is burned by finding alternatives.

- Taking better advantage of good venting conditions when they occur by co-ordinating open burning of logging and land clearing debris burning.
- Using custom venting index forecasting – 3 day, site specific forecasts instead of 2 day area specific forecasts.
- Utilizing the Woodstove Changeout Program, developing woodstove bylaw toolkit for local government and promoting efficient operation of woodstoves as well as alternative heating sources.
- Focus on traction materials management for road dust control, especially in late February and March, promote co-operation among local governments and contractors, promote purchase and use of appropriate equipment to reduce road dust
- Others.

There has already been some success in co-ordinating open burning. It is too early to say what the results of many of the strategies will be.

5. Integration with Other Air Quality Initiatives

Initially, when the co-ordinating committee was set up the possibility of integrating GHGs, CEP and the concept of zero waste had been raised. However, in the early stages it was too much for CWGs to cope with as understanding the complexity of air quality planning was enough. However, the project co-coordinator feels that these elements can be introduced as capacity and understanding is built. The comfort level and capacity of community members to understand complex issues has grown quickly. However, there is still a lack of understanding about what climate change is and how it relates to daily operations.

In the BVLD most of the combustion sources are wood and, therefore, many of the fuel sources are already carbon (and GHG) neutral. The air-quality plan is trying to reduce the amount of wood burned and therefore there is the potential to conflict with GHG planning objectivesin the home heating sector (i.e., if people switch to natural gas). Therefore, the plan embraces a woodstove changeout program which will give clients a choice between emissions certified wood burning appliances, electric or gas in an effort to provide a level playing field for the various manufacturers and retailers. However, due to the cost differential between wood and gas, almost no-one is likely to choose gas. The number that do will be so small as to be insignificant in the GHG equation.

The other major fuel is gasoline and diesel for transportation purposes. In small, remote, low-density communities there are few transportation alternatives and it is felt that there is little appetite at this time to address fuel consumption for transportation. However, there may be an appetite for cheaper, lower emission sources of fuel, perhaps biofuels if these can be shown to perform as well and cost no more than conventional fuels. This points to the need to develop economic incentives for GHG/energy-related projects, specifically designed to meet the needs of these kinds of communities.

The plan stresses value–added alternatives for wood combustion. Beehive burner operators are looking at co-generation options to produce both electricity and heat and this provides significant co-benefit opportunity. Other opportunities that could be examined during the implementation stage include energy efficiency for homes (to reduce requirement for burning wood).

A planned new energy centre for the north, developed by Community Future Development Corporation will specifically focus on GHGs as a major goal of its operations.

The air-quality plan is a good hook for introducing GHG and energy issues. However, in order to pursue a more integrated approach, the community would have to overcome traditional, single-issue approaches to wood waste for example. At present there are few incentives to address GHGs and energy use in general and air quality remains a much more pressing issue for the airshed.

6. Lessons Learned

This will be a living plan – right now the committees are focusing on reducing emissions from six sources but the focus may change over time depending on community priorities. Once a year there will be an evaluation of the plan to ensure local concerns are being met.

The use of specific emissions working groups (road dust, resource burning) has been very positive and very useful suggestions have come out of these groups.
A one time meeting on road dust was the first time that road dust related operators had come together to discuss issues and solutions.

The hiring of a facilitator has been critical to the success of the project so far. However, as the projects moved into the implementation stage, there will be less reliance on the facilitator as stakeholders take on responsibility for implementing projects and programs.

Industry (sawmills, panelboard plant) has been very co-operative and actively engaged in the process. Industry has been willing to share data, assist with funding and engage in committees to develop solutions.

The science-based, consensus-based process has been key to ensuring that there is strong support for the process and the plan from all sectors. A strong communication plan and "rules of engagement" regarding committee participation have also helped to ensure that the process has been a positive one.

Even before completion of the plan, there have been some early successes in developing measures that are likely to succeed – these include developing road dust management best practices and slash burning coordination and best practices. The committees have been very action oriented and the process has developed lots of momentum. The community level partners remain excited by the possibilities.

A local NGO (CHOKED) has been an important advocate for improved air quality and an important catalyst for the process.

7. Senior Government Role and Issues

A high level of support from the local MWLAP office has been essential for the success of the project so far. MWLAP found $68K from outside sources for the plan in addition to their own financial and time contributions. Staff attended 90% of meetings, and engaged in project planning conversations, as well as providing technical presentations and advice.

8. Contact Information

- Laurie Gallant, Footprint Environmental Consultants, Box 3746 Smithers, BC V0J 2N0, (250) 847-1672, info@bvldamp.ca
- Christine Rigby, Air Quality Meteorologist, (250) 847 7260. Christine.Rigby@gems2.gov.bc.ca
- Community Futures Development Corporation. Gerry Brody. 1 800 556 5539 (not interviewed but has information on planned energy centre for the North)

References:
http://www.bvldamp.ca
Levelton Consultants Ltd. (March, 2002). *Air Quality Summary and Assessment for Bulkley Valley – Lakes District.*

B.2 Case Study: City of North Vancouver

1. Background

Summary: Lonsdale Energy Corporation, Partners for Climate Change Program, Official Community Plan (w/ energy focus)

The City of North Vancouver (CNV), a municipality of 44,000 residents, is quickly becoming a leader in building a model sustainable community in the Lower Mainland. Through participation in the FCM PCP process and through the incorporation of the Lonsdale Energy Corporation (LEC), the CNV has made strides towards realizing community-wide goals.

PCP *A) Standalone B) Comprehensive*
The CNV has completed the 2nd milestone of the PCP process. Milestone Three is currently undergoing a 'Request for Credentials' process. The Geographical boundary is the City of North Vancouver. The geographical boundary is the City of North Vancouver.

Lonsdale Energy Corporation / Terasen Corporation District Energy System *A) Standalone B) Single Issue*
A District Energy System (DES) emerged as a viable energy-related business opportunity for the CNV through council participation in FCM sponsored events in the early 90's. Also, a council member at one time was a boiler operator and therefore, had a thorough understanding of hydronic heating systems. As a result, CNV council put forth policy and by-laws to support the implementation of a DES and the Lonsdale Energy Corporation (LEC) was born. The LEC, a corporation wholly owned by CNV, signed an agreement with the Terasen Corporation in 2003 to develop and operate a DES for new residential and commercial developments in the Lower Lonsdale neighbourhood. Through this innovative public-private partnership, the CNV was able to retain control of community planning and development while capitalizing on the Terasen Corporation's expertise of managing and providing energy-related services. The DES delivers high-efficiency energy to customers in the Lower Lonsdale neighbourhood through the production of hot water at a series of mini-plants within the neighbourhood.

Spatial Extent
The DES is planned and designed to satisfy the needs of new residential towers and commercial developments in the Lower Lonsdale Neighbourhood. The Lower Lonsdale Neighbourhood, fronting on the Burrard Inlet, is the most developed district in the City and serves as the municipality's downtown and Central Business District (CBD). As of 2004, the first mini-plant was providing heat to two residential towers, commercial space and a community centre. Within 10 years, 3 million square feet is expected to be connected to the DES. Subsequent phases of the utility are currently in visioning and planning stages.

Temporal Aspect
Initiated in 2003, the project is intended to be fully implemented over a 10 year period. However, current development rates may see full implementation of the current proposed system fully implemented in 6 years. Subsequent phases of the utility are currently in visioning and planning stages.

Linkages with Existing Efforts
The City's OCP (OCP Bylaw, 2002, No. 7425) details the community's vision of sustainability. The OCP recognizes opportunities for local involvement for reducing negative impacts associated with how energy is used and consumed in the community. Specifically, the OCP discusses Energy Planning Objectives. In general, this includes: promote energy efficiency and reduction in consumption in non-renewable energy sources (fossil fuels), implement community energy systems, collaborate with partners, reduce GHGs, and design of energy-efficient neighbourhoods. However, the OCP is merely playing catch up with the LEC. The LEC was formed through a clearly stated vision by the CNV Council put forth through resolutions and by-laws.

2. Planning, Organisation and Funding

PCP
Milestone One and Two were completed without any public consultation work and or planning process. Funding was not required for the first two milestones. The third milestone will be jointly funded by the FCM GMEF fund ($15,000) and the CNV.

LEC

Funding
The DES project received funding as a pilot project under the Green Municipal Fund. The Lonsdale Energy Corporation received start up and financing funds that included a $4,000,000 grant and a $4,000,000 loan. Support from the GMEF/GMIF would have not made this project possible since it would have made the rates offered by the LEC uncompetitive and inaccessible.

Budget
The total project cost is expected to be $8,133,800.

Who is involved in the LEC process?
The LEC was championed by council. Council created the required policy decisions and then tasked CNV personnel to implement the project. Initially, the DES was seen as an 'engineering project' and technical work was completed early in the process. However, the DES did not gain momentum until it was seen as a 'business project'.

Public Consultation
There was no formal public consultation for the establishment of the LEC. However, the initiative had been discussed in council sessions with several resolutions resulting. Stakeholders such as developers had been consulted and educated regarding the DES.

3. Data Gathered (inventory and baseline)

PCP: Milestone 2 complete. Inventory data was provided to the CNV by the GVRD

LEC: No data was collected for the establishment of the LEC related to air quality. However, early feasibility and technical studies were completed in order to establish the business case for the incorporation of the LEC. In fact, the CNV won an award from BC Energy Aware in 1998 for their initial DES study.

4. Implementation and Results Achieved

From a business perspective, the implementation of the LEC required the establishment of business relationships with a utility provider, in this case the Terasen Corporation. The LEC was then incorporated and the public-private partnership with Terasen followed. The project, from the inception, has been completely organised and managed from within the CNV with no extra staffing required or sought. The CNV council serves as the public interest regulator to ensure fairness and transparency and as a shareholder to ensure economic sustainability. The LEC did not undergo a process with the BC Utilities Commission since it is regulated by an elected body. The CNV indicated that undergoing the BCUC process is very unattractive when partnering with a utility provider. From a technical perspective, the implementation of LEC included the development of several 'mini-plants' throughout the Lower Lonsdale neighbourhood. By creating several smaller scale mini-plants, the LEC was able to match marginal costs with marginal income. This has been tremendously effective and successful for the CNV. A medium to long-term implementation strategy focused was developed in 1998 which focused on creating the conditions under which a DES could develop over time rather than embarking on a major 'big-bang' project (www.energyaware.bc.ca).

Challenges
Several organizational and provincial and federal government policy-related barriers were identified by the general manager of the LEC. These are felt to be applicable to any community seeking to implement a community energy project and are outlined in Section 6.

Results
The DES now serves several users in the CNV. Specific results related to air quality and GHG reductions have not been evaluated. However, space heat by hydronic systems in the case of the CNV is 85-90% efficient versus 20-25% efficient when using electrical heat.

5. Integration with other Air Quality Initiatives

LEC – A long term goal of the LEC is to reduce as much as possible the use fossil-fuel for heat production.

6. Lessons Learned

The CNV, through the incorporation of the LEC and the formation of a public-private partnership with the Terasen Corporation, offers a level of experience and expertise valuable to the Province and other BC municipalities. Their experience has revealed the following challenges, lessons and observations:

Personnel capacity/capability challenges
There is a noticeable lack of capacity and capability in BC municipalities to conceive and/or implement energy-related projects. This is due to a lack of history in engagement with energy projects (with the exception of New Westminster) and lack of personnel capacity to deal with energy/utility industry. Also, there is very little experience in BC municipalities in planning energy utilities from a technical and business perspective.

The CNV's experience with the LEC points to opportunities for local economic development for the community and for the municipality itself. From project inception, the CNV saw a DES as an economic development opportunity; this vision has had considerable influence on the processes they underwent to realize this. CNV Council participation in FCM sponsored events played a large part in revealing this opportunity.

7. Senior Government Role and Issues

The below information is taken from direct communication with the LEC General Manager:

BC municipalities and the energy sector
In general, energy has been a provincial concern and has, therefore, not required BC municipalities to gain expertise or experience in this sector. Other Canadian municipalities, namely in Ontario and Alberta, have been active in the energy sector and therefore have a depth of experience and expertise in implementing projects. In conclusion, the CNV's experience and research indicates that BC municipalities are much less involved and lack capacity to be involved in the energy sector when compared to municipalities across Canada. All this points to an incredible opportunity for the Province of BC to be active in engaging municipalities in this sector and providing technical, information and business development support.

General Energy Policy
In general, BC utilizes large amounts of high-grade energy (electricity) for low grade uses (space heating). There is immense opportunity for BC municipalities and the province to be engaged in providing a grade of energy that matches the end use. In the case of the CNV, the DES is 85-90% efficient where as space heating by electrical energy is approximately 20-25% efficient (Bill Susak). Essentially, technology dependent on end use will result in greater efficiencies for municipalities and the province. The role of municipalities in BC can not be ignored in making energy use more efficient. The role of the Province should be to engage and support municipalities in this sector since BC municipalities can play a large role in displacing electricity use in the province. Also, energy rates in BC are prohibitive since new investment will yield a low rate of return.

Federal Tax Policy
In the case of municipalities, boilers purchased were assigned a Capital Cost Allowance (CCA) rate of 4%. In the case of an industrial operator, boilers are assigned a CCA rate of 35%. This taxation policy is punitive for community's seeking to implement community energy systems. Environmental, energy and tax policies should be reviewed for fundamental discrepancies. [CCA: The Capital Cost Allowance is a tax deduction that Canadian tax laws allow a business to claim for the loss in value of capital assets due to wear and tear or obsolescence (Canada Customs and Revenue Agency)]

8. Contact Information

Bill Susak, General Manager, Lonsdale Energy Corporation
604-983-7335 bsusak@cnv.org
Michael Hunter, Environment Manager

References:
www.cnv.org
City of North Vancouver Official Community Plan. OCP Bylaw, 2002, No. 7425

B.3 Case Study: District of North Vancouver

1. Background

Summary: The Maplewood Community Eco-Industrial Partnership Project (The Maplewood Project).

The Maplewood Local Plan, adopted by the District of North Vancouver (DNV) Council in October 2002, provided the planning framework to support the development of a complete and sustainable community. The DNV entered into a contract with a group of consultants to use an Eco-Industrial Networking approach to refine the Local Plan objectives and develop concrete designs and projects to move the Plan forward. EIN encourages industrial development that reduces resource consumption; promotes use of renewable energy, promotes natural stormwater flows; protects and incorporates ecological features; and promotes connectivity to other businesses and immediate neighbourhoods.

EIN involves a systematic inventory and analysis of energy, material and waste flows in the community. This data is used to identify opportunities for new business and community development as well as efficiency initiatives within the existing businesses and community. As such, it represents a different approach to community energy and greenhouse gas planning that focuses on industrial inputs and outputs and the development of relationships between key stakeholders.

The project was initiated by a group of consultants and the now retired Assistant Manager of Planning. The DNV Community Planning Dept. then worked closely with the consultants to define the terms of reference for the project and to develop the relationships and trust building required to gain broad support for project and resulting initiatives.

Spatial extent: The Maplewood local area is a 550 acre site located on the Burrard Inlet, just east of the Second Narrows Bridge and along the Dollarton Hwy. The area includes a large industrial base comprised of large port-oriented uses augmented with a variety of smaller mixed industrial businesses, a small residential community of approximately 2500 residents and a small local-serving retail district.

Temporal aspect: The Maplewood Project was initiated in 2001 and it took several months to raise funds for and convince partners of the merits of the project. It was envisioned to be an ongoing project and it was recognized that implementation of key initiatives could take several years. However, over the course of one year (Nov 2002 – Sept. 2003), the bulk of the visioning, capacity building, strategy, and initial feasibility work was completed. The implementation of the project will be on–going for some time and DNV staff are currently preparing a detailed implementation plan.

Linkages with existing efforts: The Maplewood Project was linked to the Maplewood Local Plan in that it sought to build on the momentum created by the consultation process for that Plan and strived to translate broad policy into specific design and action. It also built on PCP Milestone One work that had already been completed by the District.

2. Planning, Organisation and Funding

The Maplewood Project

Funding

Project funding was secured through the project partners, local and regional governments, outside agencies and federal funding organisations. In-kind and cash support was provided by the District of North Vancouver ($35,000) local industrial operators ($40,000+), the Real Estate Foundation ($30,000), the Vancouver Port Authority ($8,000), the GVRD ($10,000) and the Green Municipal Enabling Fund ($88,000).

Budget

The total project budget was approximately $200,000.

Who was involved?

The process was highly participatory and included many local and regional stakeholders. A Core Working Group made up of District and consulting team members guided the project, made key decisions and closely reviewed work items. Representatives from other stakeholder groups had a standing invitation to participate in the core working group meetings. The working group met once every one to two weeks. A Maplewood Advisory Committee (MAC) comprised of project funders, community representatives and local businesses met in workshop format (facilitated by consulting team) to provided input and advice to core working group, especially regarding substantive and procedural considerations. Some MAC members represented a broader constituency and were accordingly responsible to report back to that constituency to ensure free flow of information regarding the project. The MAC met approximately once every 4 to 6 weeks. Also, individual industrial operators were consulted to determine their needs, challenges and future directions. Lastly, a community design charrette was held in May 2003. As the centerpiece of the project, the charrette included over 50 participants. Three teams worked together for three days. Each team included two community residents, two industrial business owners/operators, one DNV planner, one DNV engineer, and supporting design professionals. DNV Council was also kept abreast of any news and was presented with regular updates.

Public Consultation
Although core working group and MAC meetings were not open to the general public, representatives from the Maplewood Community Association were actively involved in the entire process. A public open house was held after the charrette and was attended by community residents and business representatives and their input was actively sought. A community mapping exercise was used to identify issues and solutions.

Challenges
Sustainability and eco-industrial networking are complex development topics in themselves and present communication and participation challenges during a consultation process. Building knowledge capacity and education exercises into the process are necessary to encourage support from participants. A large front-end commitment was required from the consulting team, project participants and the municipality before the project officially began. Another noteworthy challenge that the DNV faced was internal capacity and knowledge of energy-related and GHG issues and considerations.

3. Data Gathered (inventory and baseline)

Baseline
Data was collected at several stages of the project. Initially, meetings were held with each industrial partner in order to determine energy and material consumption, transportation needs and patterns, and process information. Similarly, an energy inventory and analysis of the residential and commercial community was completed. Information gathered from industrial partners did not generally include air emissions with the exception of two partners who were emitting hydrogen as a by-product of their industrial process.

Baseline data for energy consumption and GHG emissions was calculated based on the information from BC Hydro, Terasen Gas (both of whom were partners in the project) as well as information provided by the industrial partners.

Data Challenges
Industrial partners were initially hesitant to provide detailed information regarding their industrial process, energy and material consumption. As the project progressed and trust was built, partners became more willing to share, especially during the charrette when the face-to-face interaction over several days built a much higher level of trust between participants.

4. Implementation and Results Achieved

Ideas and strategies
Opportunities for Renewable Energy Projects and Improved Energy Management were identified during the project and received a lot of support from the partners.

Implementation of Maplewood Project
The development of a solid and feasible implementation strategy remained a goal for all team members from inception through to completion of the project. However, the implementation strategy at this point remains a just that, a strategy. Next steps and actual implementation of project findings will require further funding and commitment from DNV Council. Some work has been completed in order to take advantage of small funding opportunities and/or support programs such as possible BC Hydro PowerSmart membership, but major steps forward will require more funding and time from DNV personnel.

Results
Further developments and action-oriented implementation await further funding, staff resources and political direction. However, DNV and GVRD staff have initiated discussions with utility providers in order to develop and Coordinated Energy Management Group per the implementation strategy. Also, District Council will be asked to consider funding the preparation of a video for the project. The video will seek to capture the Maplewood Project story to fulfill the DNV's commitment under the GMEF funding agreement to present the results to other communities. It is also expected to be useful for the DNV as a marketing tool for EIN-related developments and community initiatives in Maplewood. The DNV

Community Planning Dept. is expecting to bring forward a detailed Implementation Report containing more detailed proposals for some key project findings by mid-2004 for Council's consideration.

Directions that are envisioned include development of green building guidelines, performance-based zoning, community coordinated energy management group(s). However, as stated, this will require broader community policies that will serve as a foundation for new progressive policy development. The DNV's next Strategic Plan is expected to include sustainability as a goal and the District Official plan is expected to follow suit during its next review.

Challenges
In general challenges for further implementation can be attributed to lack of funding and/or resources. Staff time is currently tied up completing required daily activities. In fact, most DNV staff who were involved in the project are still 'paying the price' for the time invested in the project. Next steps will require commitments from Council to undertake identified projects and new outside funding resources.

5. Integration with other Air Quality Related Initiatives

The momentum created by the Maplewood Project effort and the issues raised, discussed, and investigated will form a basis for further discussion about broad environmental goals of the community. In particular, a broad community-wide discussion regarding community energy and greenhouse gas action planning is expected to result from the project. Essentially, the Maplewood Project will serve as a springboard for further energy efficiency, renewable energy generation and GHG reducing initiatives in the community and how community land use planning can contribute to those initiatives.

At this point, the DNV expects to focus on establishing broad policy goals so that subsequent by-laws, regulations and development requirements reflect the directions discussed during the Maplewood Project.

Air-quality was not specifically considered during the Maplewood Project and it is not likely that energy and GHG related initiatives will be combined with air-quality considerations in the near future. This is because air quality has not been highlighted as major concern by the community. In addition, air-quality planning is seen as a regional responsibility and one that local muncipalities have relatively little influence over. However, as far as energy and GHG reducing initiatives reduce CACs this will be seen as an added bonus for the project.

6. Lessons Learned

In this case EIN proved to be a useful way to approach issues of energy and GHGs as part of a broader initiative to address economic and community development. Neighbourhood-focused projects such as the Maplewood Project can serve as a springboard for broader community discussion regarding energy consumption/generation and GHGs. The findings and final report for the Maplewood Project will point to new strategic directions for the DNV and will inform the development of new policy, regulatory initiatives and/or co-operative efforts amongst stakeholders. However, for the DNV this was, and continues to be, a time intensive undertaking. Essentially, the DNV will require further funding and on-going commitments from Council to carry out implementation of the initiatives identified during the Maplewood Project.

7. Senior Government Role and Issues

Such initiatives can serve as an opportunity for the Province to be engaged with communities at a very local level. This could be through direct funding, provision of information resources, personnel support and/or training support.

Federal (GMEF, Industry Canada) funding was essential for completion of the project and will likely be required for implementing many of the initiatives.

Participation of representatives from both Provincial and Federal Government Agencies helped lend credibility to the project and provided input into the process that was useful in which of the many directions to pursue.

8. Contact Information

Doug Allan, Senior Development Planner, District of North Vancouver

References:

District of North Vancouver, October 2002. Maplewood Local Plan. District of North Vancouver.

Von Hausen, Michael et al. 2004. The Maplewood Project: Sustainable Community Planning and Eco-Industrial Development Opportunities in a WestCoast Community. District of North Vancouver. North Vancouver, BC

B.4 Case Study: Greater Vancouver Regional District

1. Background

Summary: Numerous initiatives related to Air Quality, Greenhouse Gases and Energy Management.

The Greater Vancouver Regional District (GVRD) is a partnership of 21 municipalities and one electoral area that make up the metropolitan area of Greater Vancouver. Located in the Lower Mainland of British Columbia, the region is home to approximately 2 million residents and is expected to grow to 2.7 million by 2021. The GVRD plays a key role in coordinating and planning regional environmental concerns since as an organisation it supplies and treats potable water, collects and treats wastewater, manages solid waste disposal, develops growth management plans, manages regional parks and has mandated responsibility to regulate air emissions under the BC Waste Management Act. The GVRD monitors air quality, and develops and implements air quality plans and regulations.

The GVRD has taken a leadership role in Canada in seeking solutions to environmental issues in the region. In 1994, the GVRD became the first region in Canada to adopt an Air Quality Management Plan (AQMP). New programs and initiatives are seeking to simultaneously address the problems of local air quality and climate change. These focus on energy use efficiency and renewable energy sources, and include green building retrofit and new construction programs and Eco-smart Concrete. . The GVRD has set in motion the Sustainable Region Initiative (SRI) which provides a sustainability framework within which the Liveable Region Strategic Plan (LRSP), AQMP and other plans will be reviewed and updated. The SRI emphasizes opportunities for synergy in current GVRD planning processes and/or support programs for member municipalities.

The GVRD has done extensive work in all three air-quality related planning processes and sees three main spheres of influence:

1. Corporate initiatives to reduce GHGs and CACs from activities associated with the GVRD's own activities;
2. Mandated responsibility for air-quality, solid waste and liquid waste management plans and review capacity for transportation related plans;
3. Working with member municipalities and other partners to promote voluntary initiatives.

GHG Action Planning: *A) Component of a Broader Initiative, B) Comprehensive*
The GVRD's enrolment in the PCP program in 1996 was the trigger to begin working with muncipalities on GHG action plans. GVRD offers support by creating inventories for each municipality and offering support to develop programs and actions. The firs step was to develop a number of programs under the Air2000 initiative that could assist municipalities to reduce emissions. These include a Green Buildings Program, Better Buildings retrofit program, an industrial eco-efficiency program, and the Eco-Smart Concrete program. The GVRD is now encouraging member muncipalities to develop local GHG Action Plans (under the PCP program). As part of this commitment it has developed a Greenhouse Gas (GHG) Action Guide as a resource to help municipal members implement actions that derive a greenhouse gas emission reduction benefit. It also provides a menu of actions for GVRD member municipalities to consider in the formation of their local GHG Action Plans. Recognizing that municipalities have limited resources, the GHG Action Guide identifies adaptations to existing municipal practice that can be implemented through tools that are already available to municipalities, and by specifying resources, such as funding sources and programs, to which municipalities may gain immediate access. Wherever possible, program descriptions and contact information have also been provided to facilitate timely implementation. The GHG Action Guide focuses on two key strategies: improving energy efficiency and increasing use of renewable energy.

The guide is structured to be compatible with other resources that facilitate municipal efforts to address climate change. These include: the Cities for Climate Protection (CCP) software used by the Partners for Climate Protection Program; GVRD Demand Side Management programs; and The Survey of Local Initiatives and Opportunities for Greenhouse Gas Management in Greater Vancouver (GVRD and Compass Resource Management, 1998).

Community Energy Planning *A) Component of a Broader Initiative, B) Comprehensive*
The GVRD has no mandated responsibility for energy planning in the region. However, recognizing the clear relationship between energy, air quality and GHG emissions, the GVRD has pursued a number of initiatives to explore energy efficiency and renewable energy alternatives in the region and encourages member muncipalities to adopt these. For example, the GVRD, in association with the BC Energy Aware Committee organized a series of workshops for member muncipalities that identified challenges and opportunities. The GVRD is also completing studies for renewable energy projects in their parks and facilities. Studies include wind power feasibility in parks and geothermal heating and cooling system retrofit feasibility in a multi-family housing complex. Realized projects include the use of photovoltaic lighting in some regional parks and biogas recovery and use at

wastewater treatment facilities and landfill sites. Lastly, the new water treatment facility will utilize geoexchange technology. In addition, the *Forging a Sustainable Energy System in Greater Vancouver: Suggested Approaches and Preliminary Policy Directions for the GVRD (July 2003)* report was completed as a supplementary report for the cities^{PLUS} international competition. The cities^{PLUS} project was part of the International Urban Systems Design Competition sponsored by the International Gas Union. The Greater Vancouver team represented Canada at the competition and was the winning team over eight other competing cities. Through this report and the process that informed it, the GVRD was provided with guidance on community energy planning that is applicable across the region. The report was intended to be a high level strategic document and does not include detailed action plans, monitoring programs and/or recommendations for integration with other strategies.

Air Quality Planning: *A) Component of a Broader Initiative, B) Comprehensive*
The objective of the GVRD AQMP (1994) was to develop a comprehensive strategy for air quality management in the Greater Vancouver Regional District which assesses issues, prioritizes problems, and develops appropriate actions to protect public health and the environment based on:

- an integrated approach to regional land use, transportation and air quality planning in keeping with the Creating Our Future "Steps to a More Liveable Region";
- a strengthened management approach for all emission sources for which the GVRD has regulatory responsibility;
- increased cooperation and collaboration with federal, provincial, regional and municipal governments and U.S. authorities in Washington State to achieve an integrated airshed approach to resolving air quality problems in the Lower Fraser Valley air basin;
- full public and stakeholder involvement to ensure that efficient and effective solutions are identified and applied to specific issues or problems in a fair and equitable manner.

The GVRD is currently updating their AQMP and is expected to complete a draft plan by November 2004. It is using a harmonized approach, including concurrent reductions of Greenhouse Gases and Common Air Contaminants through implementation of emission reduction measures. An internal document has been prepared and a workshop for targeted stakeholders will be held in April 2004. A second workshop (May) will be more detailed and include a background document on emission reduction measures.

Consideration of a harmonized approach started several years ago the when the GVRD started to think about updating the AQMP. Given the pressing nature of global climate change it was obvious that the GVRD should have both a GHG action plan and an AQMP and it made sense to combine the plans.

Main AQMP goals will be:

- Reduce health impacts of air quality
- Improve VISIBILITY
- Reduce impact of climate change

2. Planning, Organisation and Funding

The GVRD operates under a clearly-stated and broadly-scoped mandate from the provincial government to regulate and manage air quality in the region. The Policy and Planning Department coordinates air quality regulations, monitoring, permitting and long-range planning initiatives including the AQMP.

GHG Action Planning: In contrast to CACs, there are currently no regulatory controls on the emission of GHGs in the GVRD. Actions in the GHG Action Guide were developed in close cooperation with GVRD member municipalities through regional advisory committees and the GVRD Regional and Local Government Working Group on Climate Change to ensure that they meet municipal needs and can be readily incorporated into their regular activities. An Air Quality and Greenhouse Gas Management Issues Group has been formed as part of the SRI process.

Energy Planning: An energy task group has been formed to provide input and advice to the SRI process. In addition, the cities^{PLUS} plan, which was developed over a period of 18 months, involved an intensive consultative process. As part of this process, an Energy Foundation Team was established to review an early version of the Energy Foundation Paper and to provide input into the energy scenario. A series of workshops also solicited input into the energy scenario in 2002 and early 2003 - two in Ottawa and one in Burnaby.

Air Quality Management Planning: The development of the regional AQMP (1994) included a number of key steps to define the extent of the regional air pollution problem. It also identified appropriate measures to deal with it. The GVRD's key steps were:

- Establish ambient air quality objectives or standards which protect public health and the environment.
- Conduct air quality monitoring to measure compliance with the objectives and standards.
- Develop an accurate emission inventory to identify all sources of air pollution.

- Assess current and future air quality using population, land use, transportation, and economic activity projections and air quality modeling techniques.
- Consult with the public, stakeholders and decision makers to establish air quality goals and priorities.
- Develop emission reduction strategies and measures to achieve air quality goals.
- Circulate the draft AQMP for review and comment, and revise the draft Plan as a result of the consultation program.
- Implement the approved AQMP, and keep it relevant and effective through periodic assessment of achievements and deficiencies, with appropriate revisions and updates.

The GVRD is currently reviewing their AQMP plan. Two reports have been completed to inform the process. They are:
- Phase 1 "Options for Reducing GHGs and Air Pollution in the GVRD" (Oct 2000) developed an analytic base from which the GVRD might develop and analyse options to reduce GHG emissions and CACs in its jurisdiction.
- Phase 2 "Harmonized Measures for Reducing GHGs and Air Pollution in the LFV" (Sept 2001) expanded on Phase 1 work to include the LFV and more comprehensive analysis of the GVRD component.

The Air Quality Committee (GVRD board members), the Let's Clear the Air Steering Committee (Board members, GVRD Staff and BC government representative) and a Lower Fraser Valley Air Quality Advisory Committee (broad stakeholder group representing industry, business, governmental, non-governmental and special interest operators and organisations) are providing oversight and input into the plan.

The 1994 AQMP, a two phase public and stakeholder consultation program was employed and included:
- Phase 1: The Stage 1 and Stage 2 reports were reviewed during the period from May to October 1992. The Phase 1 consultation report was released in January 1993.
- Phase 2: The draft AQMP was released in February 1994 through to July 1994. The Phase 2 consultation report was submitted to the GVRD Air Quality Committee and the Board of Directors in September 1994.

2004 AQMP public/stakeholder consultation:
Air Quality co-ordinating committee (mid level bureaucrats from Env. Canada, NW Air Pollution Authority, GVRD, MWLAP) meets three to four times a year and plays a role of information dissemination between different jurisdictions.

Georgia Basin/Puget Sound Airshed Partnership includes US EPA, Washington State dept of ecology, FNs, plays a similar role of information sharing and linkages. Tries to ensure that action in one airshed, doesn't have a detrimental effect on another.

3. Data Gathered (inventory and baseline)

Energy Planning: A key document is the "cities^{PLUS} – Forging a Sustainable Energy System in Greater Vancouver: Suggested Approach and Preliminary Policy Directions for the GVRD: Two other cities^{PLUS} reports informed the 'Forging a Sustainable Energy System in Greater Vancouver' report. They were:
- Foundation Paper on Energy (Nov. 2002)
- The Story Behind the Energy Scenario (Feb. 2003)

Air Quality and Greenhouse Gas Planning:
Early air-quality planning in the region recognized the growing importance of climate change and the role of GHGs. However, the 1994 AQMP did not inventory GHG emissions and covered the following common air contaminants (CAC's): (source, pg. 4-1, GVRD AQMP).
- Particulate matter (PM);
- Carbon monoxide (CO);
- Sulphur oxides ($S0_x$);
- Nitrogen oxides ($N0_x$); and
- Volatile organic compounds (VOC)

Measurement techniques included the following:
- Some information obtained from direct measurement:
  - Permanent/Dedicated Measurements: 198 samplers at 47 stations located in 14 member cities and municipalities throughout the GVRD. 22 of the stations communicate

continuously via telemetry to the GVRD office in Burnaby. Air quality measurements from BC Environment monitoring stations located in Pitt Meadows, Abbotsford and Chilliwack transmit continuous data to the GVRD as well.

- Temporary Sampling: The GVRD conducts special air quality studies to gather data in an area of particular concern not covered by the fixed network, contribute to co-operative air quality research with other agencies, and respond to air quality emergencies. Short-term monitoring projects may utilize a variety of instruments deployed individually at a site or combined into one of the GVRD's Mobile Air Monitoring Units (MAMU).

The following sources were considered:

- Point sources (commercial/industrial sources with regulated discharges and other stationary sources with significant emissions);
- Mobile sources (light and heavy duty motor vehicles, trains, ships, airplanes, off-road engines);
- Area sources (space heating, fuel transport, storage and filling, paints and solvents; and
- Natural emissions (i.e. forests)

For the new AQMP (2004) process, more recent inventories (2000) have addressed both CACs and GHGs. The GVRD has developed CAC and GHG emission inventories for the Lower Fraser Valley Airshed (which includes a US portion). Emissions are calculated for point sources, area sources and mobile sources and the contribution of member municipalities have also been calculated. These both include analyses of GHGs (CO_2, CH_4, N_2O) and CACs (CO, $N0_x$, $S0_x$, VOCs, PM_{10}, $PM_{2.5}$, Road Dust, Ammonia, and 'smog' producing emissions).

New inventories done every five years. Methodologies change so GVRD backcasts to 1985 using revised methodologies to get a proper trend analysis. Municipal emissions are calculated from regional numbers. Point sources plus pro rated area and mobile sources. Some was based on fuel use for each municipality. Trends indicate that GHGs will continue to climb. CACs will continue on a downward trend.

Challenges

Methodologies are always changing especially for models. Relying on others for data such as ICBC and utilities can be a challenge. International shipping is a challenge (fuel quality unknown).

4. Implementation and Results Achieved

Energy Planning: Energy-related initiatives at the GVRD have been largely staff driven. The cities^{PLUS} – Forging a Sustainable Energy System in Greater Vancouver: Suggested Approach and Preliminary Policy Directions for the GVRD. An energy action team has been established to examine energy related opportunities.

GHG Action Planning: It is too early to speak about results as GHG action planning is still in its infancy. However, the GVRD will be working with member muncipalities to develop Local Action Plans for the reduction of GHGs. Staff will encourage municipalities to look at energy-related development opportunities as part of these plans.

Programs already implemented related this effort include:

- Better Buildings program: The Better Buildings program is a partnership initiative coordinated by the GVRD to help municipal, institutional, commercial and industrial building owners and managers achieve efficiencies through building retrofits.
- EcoSmart Concrete™: Led by the GVRD, the EcoSmart Concrete Project is a joint government-industry initiative to reduce greenhouse gas (GHG) emissions.

However, GHG emissions in the region are predicted to continue to rise as a result of population growth and increased vehicle miles travelled as well as vehicle purchasing preferences.

Air Quality Management Plan: The AQMP (1994) contained 54 specific emission reduction actions and 33 recommendations about how to take a co-operative approach to putting these actions into place. Thirteen air quality issues were identified and then placed in order of priority according to their health and environmental risks. The priorities were:

- Priority #1: Smog and fine particulate matter
- Priority #2: Visibility, hazardous air pollutants and global warming
- Priority #3: Odour, carbon monoxide, sulphur dioxide, acidic deposition and nitrogen dioxide

- Priority #4: Total particulate matter and volatile organic compounds

A key objective of the AQMP was to reduce the overall emissions of the most common air contaminants - carbon monoxide, sulphur and nitrogen oxides, particulate matter and volatile organic matter - by 38 per cent (from 1985 levels) by 2000. Through a combination of new technologies, education and awareness efforts and focussed programs like AirCare, total emissions decreased by approximately 40 per cent during the period. Direct policies, by-laws and direct actions that have resulted from the AQMP process include:

Policies

- Outdoor Burning: Municipalities are responsible for approving any outdoor burning within their boundaries. While outdoor burning is banned in most areas, some municipalities still allow burning during restricted periods. An Air Quality Complaints and Enquiries Line is available for more information.
- Integrated Enforcement Strategy: The GVRD's air quality, liquid waste and solid waste regulatory functions have been integrated to establish a "one-window" point of contact with the GVRD for regulated businesses. A draft was released in July, 2003 and is currently undergoing stakeholder review. It was expected that the finalized strategy will be implemented by January 1, 2004.

By-Laws

Air Quality Management Bylaw No. 937 (March 2000): The permit can specify allowable emission levels, requirements for controlling emissions and requirements for monitoring and reporting emissions.

- Emission regulations: Emission regulations are an alternative to issuing site-specific permits to manage the air pollution from individual industrial, commercial or institutional sources. The emission regulations currently in effect are:
    - Ready Mix Concrete and Concrete Products Industries
    - Gasoline Distribution Terminals
    - Gasoline Bulk Plants
    - Fuel Transfer Vehicles
    - Automotive Refinishing
- Compliance Monitoring: The GVRD monitors the air emissions produced by air emission permit holders to determine whether these companies are complying with the terms of their permit.

Direct Actions include

- AirCare program: The GVRD, the provincial government and Environment Canada worked together to develop AirCare, Canada's first mandatory light-duty vehicle inspection and maintenance service.
- BC Scrap-it Program: The Scrap-It Program offers incentives to owners of older, higher-polluting motor vehicles to replace their vehicles with newer ones or an alternate form of transportation.
- Mow Down Pollution Program: Mow Down Pollution is a nation-wide program designed to encourage and reward people for getting rid of their older, high-polluting mowers.

The current work to update the AQMP, suing the SRI framework recognizes the importance of five sectors as having particular relevance to air quality and GHG emissions. They are:

- Energy
- Buildings
- Transportation
- Industry
- Land Use

Five strategies were suggested by the SRI Air Quality and Greenhouse Gas Management Issues Group to reduce both air-quality and GHG emissions. These are:

1. Reduce the use of fossil fuels
2. Burn cleaner fuels
3. Burn fuels more cleanly
4. Reduce emissions from other sources
5. Reduce emissions through public education and increased awareness

Specific actions were bundled into action bundles and include the following:

- "Diesel Solutions" Action Bundle that targets emissions of diesel particulate matter. Includes Heavy Duty Vehicle Clean Fleet Challenge: Air-Care On road Program for Heavy Duty Vehicles; GVRD Anti-idling Bylaw and other related measures. Ocean Going Vessels measures, Ferries Measures, Railways
- "Gasoline Solutions" Action Bundle that includes clean vehicle and Engine Feebates, 85% ethanol Blended Gasoline for GVRD Vehicles; Employee/Student Trip Reduction Program; GVRD Anti-idling Education Campaign; and lobbying the Federal Government for a Minimum 10% ethanol content of gasoline;
- Space Heating, Boilers and Heaters Action Bundle includes New Residential Furnace Standards; Industrial/Commercial/Institutional Boilers and Heaters standards; Residential Heating/Hot Water Public Education Program; GVRD New Woodstove Bylaw; and a GVRD Wood burning curtailment policy
- Burrard Thermal Generation Plant

It should be emphasised that none of the above actions have yet been endorsed by the GVRD.

5. Integration with other Air Quality Related Initiatives

Recently, the GVRD has integrated both CACs and GHG considerations into its air-quality planning process. The *1994 AQMP* addresses only CACs but the more recent *2000 Emission Inventory for the Canadian Portion of the Lower Fraser Valley Airshed* also includes both CACs and GHGs. The GVRD's recent direction has expanded on this integrated approach to include considerations of energy planning as well.

The 2nd Phase of the SRI saw the formation of 'Issue Groups' focusing on preparing goals, strategies, actions and measures of success in key areas of relevance to sustainability in the Greater Vancouver Region. The Issue Groups were comprised of representatives with expertise in each area who were asked to develop a report and recommendations on their area of expertise. The GVRD cautions against construing the findings from the Issues Groups as representing completely the views of the participants, the organizations with which they are associated, or the Greater Vancouver Regional District. Two Issues Groups of specific relevance to air quality, GHGs and energy planning included: SRI Air Quality and Greenhouse Gas Management Issues Group who put together a Goals, Strategies, Actions and Implementation Priorities report (May, 2003) and the Energy Task Group which created a report as well (May 2003). Both Issue Groups identified opportunities for synergy and harmonization for integration of air quality-related initiatives. Most noteworthy was a strong recommendation to "give priority to initiatives that reduce both common air contaminants and greenhouse gas emissions." This was generalized as a guiding principle that 'actions should have multiple benefits that promote overall sustainability' (p. 8 – AQ Issues Group report)

Ultimately, the recommendations and principles from the Issue Groups reinforce strategic directions in the Greater Vancouver and Fraser Valley Air Quality Management Plan – Phase 2 Final Report: Harmonized Measures for Reducing Greenhouse Gases and Air Pollution in the LFV (Sept. 2001) report. The Phase 2 report not only reviewed the benefits from harmonizing the processes but also examined specific sectors and opportunities for emissions reducing measures (for both CACs and GHGs).

The strategies that came out of the SRI Energy Issues Group were considered by the SRI Greenhouse Gas and Air Quality Issues Group. It is unclear how far down the energy road GVRD can go because of the lack of mandate where energy is concerned.

6. Lessons Learned

The GVRD found that it was important to develop initiatives that provide municipalities realistic opportunities to reduce and measure emission reductions (AIR2000 initiatives such as Eco-Smart Concrete, Better Buildings Program etc.) before embarking on the work to develop GHG action plans.

The technical expertise that the GVRD offers, especially base-lining/inventory assistance is critical, especially for smaller muncipalities which do not have the resources for this work.

Identifying actions that have multiple benefits and focusing on actions that have both GHG and air quality improvements is a key avenue for success.

Having mandated authority to regulate air quality provides a strong hook on which to build other initiatives. However, without mandated authority to deal with GHGs and energy the GVRD is limited in how effectively it can integrate air quality (its primary responsibility) with GHG and energy issues.

Role of GVRD staff is critical to identifying opportunities for integration. Much of the work outside the mandated responsibility of the organization is lead by planning staff that demonstrate an inclination to integrated approaches.

One cannot assume that initiatives to reduce GHGs also improves air quality but most often it is true. There is the concern that working to improve GHGs will result in poorer air quality. Examples where this might be the case include:

- replacing gasoline engines with diesel engines will reduce GHGs but result in poorer air quality
- Wood, considered GHG neutral can lead to reduced air quality
- Emission control devices used to reduce CACs use energy and therefore increase GHG emissions.

The GVRD's prime mandate is air quality, with GHGs secondary. The BC Waste Management Act doesn't exclude GHGs but health I(and therefore air quality) is the primary driver. In general. The GVRD attempts to look for and focus on complementary measures. Energy efficiency, for example, does help for both GHGs and air-quality issues.

GVRD recognizes that energy efficiency itself is not going to be enough to address worrying trends in both GHGs and CACs because efficiency gains are generally overwhelmed by other changes such as increased consumption, increased vehicle size and population growth.

7. Senior Government Roles and Issues

As a regional government GVRD plays a number of important roles including regulator of air emissions, co-ordinating the actions of member municipalities, and providing technical assistance.

Possible roles for Provincial and Federal Governments include:

- Develop minimum ethanol content standards for gasoline – perhaps 10% to begin with.
- Funding for transportation
- Funding for building energy efficiency and renewable energy projects.
- Vehicle and engine standards both on and off road engines
- Marine vessels are a large opportunity fro improvement but overlapping jurisdictions make this difficult. The existing regulations are those of the national maritime organization (Treaty Based) and address the sulphur content of bunker fuel. NOx emissions – however, both are pretty minimal. Would like to see better fuel standards (lighter fuels with lower sulphur content), emission reductions technologies to reduce PM and Nox, possibly shore power while moored, and possibly differential moorage fees for heavy polluting vessels.

The GVRD would also like to see the Province set minimum energy standards for municipal building codes and for municipalities to be able to set standards that exceed these (as seen in the City of Vancouver). The code currently states that municipalities must set standards that are "consistent" with the building code; however, it is unclear whether or not municipalities can require more stringent standards. Clarity on this issue would be helpful.

8. Contact Information

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B.5 Case Study: City of Vancouver

1. Background

Summary: Climate Change Action Plans (CCAP) – Corporate and Community

A) Part of Broader Initiative B) Comprehensive

The City of Vancouver has addressed energy and emissions through a wide range of initiatives over the past 25 years, as outlined below.

Vancouver's management of Air Quality is tied closely with the Greater Vancouver Regional District (GVRD) which has regulatory jurisdiction over air contaminants. Vancouver participates with the GVRD in its Air Quality Management Plans, and works with the GVRD and TransLink to implement associated measures.

Vancouver continues to work on reducing GHG emissions, including current initiatives to develop Climate Change Action Plans (CCAP) for both itself as a corporation and for the community as a whole.

Vancouver has not completed a formal "Community Energy Plan" (CEP) for the whole community, but the GHG plan is becoming one almost by default, as its structure covers most elements of a CEP. Vancouver also created a small CEP, in the form of an "Energy Strategy" for its visionary waterfront project, Southeast False Creek. The results from this study are largely transferable to other areas of the city, and particularly to other urban development projects.

Champions and Motivation

There have been three major areas where champions have emerged in the areas of energy and emissions:

- City Council has been a key champion of all the above work, with strong leadership from the GVRD on air quality planning. City Council has given staff the mandate to work on these issues and provided the resources for the projects.
- Various academics and some of Council's Committees (Vancouver City Planning Commission in particular) have been central to progress on a number of key issues.
- On a day-to-day basis, various City staff members have been the champions to keep projects moving and maintaining high standards and innovation.

The motivation for dealing with these issues has had several dimensions:

- *Ideology* – much of the work done on climate change has been driven by an environmental preservation ethic in the city – a sense of responsibility for the planet, expressed through various advocacy and political means. This motivation speaks to Vancouver's sense of identity and its desire to be recognized as an environmentally responsible city;
- *Health* – much of the air emissions work has been done with an eye to addressing health concerns from smog and air contaminants, in a regulatory context; and
- *Financial* – some of the work on energy in particular has been driven by the awareness of the financial implications of various energy systems and the value of energy efficiency.

History

Addressing energy and climate issues has a reasonably long history in Vancouver.

- In the late 1970s, City Council developed an energy strategy to assist it in dealing with the energy crisis of that decade.
- The City has its own Charter and Building Code and with this jurisdiction it adopted the ASHRAE 90.1 (1989) standard for energy performance for many new buildings in the City, becoming one of the only cities in Canada to have an energy standard in its Building Bylaw. As of 2004, this standard is now under review among the development industry with the intent of upgrading it to the more stringent (2001) standard of ASHRAE 90.1.
- In the late 1980s, the City began work on its first large climate change policy. In 1990, Council approved in principle Clouds of Change Report to reduce carbon dioxide emissions as part of the actions to address global climate change issues. Many of the recommendations from that report have been implemented.
- In 1995, Vancouver joined the Federation of Canadian Municipalities' "20% Club", which became the Partners for Climate Protection Program (PCP) in 1998.

- The City started a significant push on more sustainable development patterns in the mid 1990s, led by a flagship development project – Southeast False Creek. Many energy, emissions and air quality dimensions emerged in that work and an "Energy Strategy" was created for the project.
- The sustainability work spread throughout the organization and it has become embedded in much of the City's business. In April 2002, City Council adopted a Definition and Principles of Sustainability to guide, prioritize and improve the sustainability of City actions and operations.
- In May 2002, Council unanimously carried the motion, proposed by the Federation of Canadian Municipalities, to support the Canadian Government's ratification of the Kyoto Protocol.
- On March 25, 2003, Council approved an emissions reduction target of 20% from 1990 levels for the corporation of the City of Vancouver, subject to evaluation of the implications of the target to ensure it is realistic. At the same time, Council created the Cool Vancouver Task Force and requested that it report back with a report on the components of a Greenhouse Gas Reduction Action Plan for both the corporation and the community.
- In June 2003, Council received the Cool Vancouver Task Force's Discussion Paper on Greenhouse Gas Reduction Planning and approved a working target of 6% below 1990 emissions levels for the city (community) as a whole, subject to a review of costs and an approved Action Plan. Council also approved a process to develop GHG Reduction Plans for both the City (Corporate) and the Community and approved $30,000 for technical support for the development of these plans.
- In December 2003, Council approved its Corporate Climate Change Plan, affirming the 20% reduction target and setting in motion an implementation strategy with far-reaching impacts throughout the City.
- Early 2004 has been dominated with the development of a draft Community Climate Change Action Plan which will be taken for public consultation from May – Oct 2004, with a final adoption target of 2004 year end.

Spatial Extent
The Air Quality planning work is integrated with the GVRD's regional planning and regulatory process on Air Quality. The Climate Change Action Plans (CCAP) are focused primarily on issues within the City of Vancouver's boundaries.

Temporal Extent
As noted above, the City has been working on air quality, energy and emissions related work for several decades. The current CCAP process has several dimensions.

- The Corporate CCAP was created between March and December 2003 and implementation has already commenced; and
- The Community CCAP, while also started in March 2003, will likely not be completed until December 2004. It will be implemented primarily between 2005 and 2010, with components stretching far past 2010.

Linkages with Existing Efforts
The CCAP is linked with programs, policy and initiatives across the City organization in nearly every department, including at a minimum:

- *Engineering Services*
    - Streets and Transportation planning, design and operation;
    - Transit planning;
    - Greenways and bicycle promotion;
    - Solid waste management (particularly the landfill gas capture project)
    - Water and waste-water management;
- *Community Services and Planning Dept*
    - Land use planning throughout the city (Central Area Plan, City wide plans);
    - Green development initiatives, including LEED and Southeast False Creek;
    - Many others;
- *Social Planning and Housing Centre*
    - Food policy;
    - Social housing development and design policy

    - Secondary Suites policy;
- *Corporate Services*:
    - Fleets management;
    - City facilities design and operation;
    - Budgets and capital planning.
- *Park Board*:
    - Community facilities design and operation; and
    - Parks maintenance.

The City's work in this area is also closely harmonized with the work of the Vancouver Richmond Health Board regarding management of air contaminants and related health issues.

The important message from the above list is how integrated energy, emissions and air quality is to all aspects of the 3 primary roles of local government:

- *A corporation in and of itself* (the emissions from its own facilities, buildings, fleets, etc.);
- *A service provider* (the emissions / energy profile associated with the services the City provides, as well as the character of the infrastructure it uses and its impacts on the energy/emissions associated with the lives of those who use the infrastructure) ; and
- *A regulator* (the policy and rules the City has and enforces and its implications on citizens behaviour and the built form of the City).

Other Agency Context:

- Like most BC communities, Vancouver operates within a provincial and regional regulatory context for air emissions, as well as within the federal policy context.
- The Federation of Canadian Municipalities and ICLEI assisted in structuring much of the early discussion and work on this issue, through the PCP process.
- A range of organizations were involved in the energy planning work in Southeast False Creek which set the stage for ongoing work across the city, including the Community Energy Association / BC Energy Aware Committee.
- Many NGO's (industry, academic and interest groups) have been and continue to be involved in these issues across the City. These groups have both lobbied for work in this area, and provided key information in support of this work.

2. Planning, Organisation and Funding

Funding: The City itself has provided the majority of the funding for the project. In addition, $25,000 has been awarded by the GVRD following an awards application. It is also likely that more will be awarded by the GVRD through the same process. The City has applied to FCM for $100,000 in GMFF funding, which is still under consideration. The City further intends to approach foundations for support as well as other federal and provincial agencies for support for particular projects in the plan.

Who is Involved in the Project?

A large number of people have been involved in the City's CCAP project, including:

- ***City staff and councillors***
    - *Sustainability Group* – this group of staff served as project managers for the CCAP, including several staff in the Group drafting the GHG plans and overseeing the events management and political stick-handling of the work.
    - *Engineering Dept* – several divisions from the Eng Dept have been involved including Solid Waste, Transportation and Streets, Fleets management and others. This group were a key anchor from the very beginning of the project.
    - *Community Services / Planning* – this group was centrally involved in much of the work, particularly those that dealt with the planning and approvals of buildings and land use plans across the city.
    - *Parks Dept* – this group was involved particularly in the corporate CCAP as they look after most of the City's community facilities.
    - *Library Board* – this group oversee the City's libraries whose facilities were an important part of the corporate plan.

  - *Corporate Services*- this group was central to the corporate CCAP, as they oversee all the City's buildings and facilities.
- ***The Cool Vancouver Task Force***
  - City Council created this task force with over 2-dozen members, of which nearly half were from the community / business (the other half being City councillors and staff). This group met with the City regularly during the drafting of the CCAPs, and were a key starting point for the larger consultation process.
- ***NGOs***
  - Several NGO's played a key role in the project, largely through the Task Force, including SPEC, the Suzuki Foundation, SDRI, BEST, and others. They provided key information and advice at all steps on technical and consultation issues.
- ***Government agencies***
  - The City worked with federal, provincial and regional government agencies on this project, drawing advice and support in many areas. Many aspects of implementing these kinds of plans require harmonization and support from senior governments.
- ***Industry***
  - Representatives of the development and building management industry were included, as was the Board of Trade and the Vancouver Economic Development Commission.

Public Consultation

- ***Cool Vancouver Task Force***
  - As noted above, the Task Force was a key element in the public consultation process, as representatives from many of the interest groups who had a stake in the project were included on this Task Force.
- ***Consultation plan elements***
  - The City's consultation plan included public notification / education elements, including launches, websites, information for wide distribution, and other elements. In addition, the City's plan included "topical" discussion tables (i.e. new buildings and energy efficiency) as well as one-on-one discussions with key stakeholders.
- ***Other City projects***
  - The City has also explored ways of integrating the messages and issues of the CCAP into the consultation processes associated with other City projects, such as its green buildings initiative, its Southeast False Creek planning project, and others.

A number of challenges have been identified including:

- There are many stakeholders involved in the Community CCAP and they will be impacted or asked to participate in changes in behaviour to reduce GHG emissions.
- Cost for both the consultation process and the actions that need to occur is always a central issue.
- Other agencies are also pursuing similar issues under other projects and it can be challenging to not "over consult" certain groups on similar issues – e.g. the City found that other levels of government were consulting the development industry on new more stringent energy performance regulations, and the City had to be careful to not start the same consultation discussion for itself, but rather to fit its discussion into those of the other agencies.

The process of developing the CCAPs involved considerable expense, including:

- The cost of staff / consultant team to oversee the process (2 full time staff to project manage the process for 1.5 years);
- The cost of a broad range of staff to participate in the planning process, particularly for the Corporate CCAP – just developing the baseline cost many weeks of full time effort for several staff, over several months;
- $30,000 for technical support in the drafting of the first draft of the CCAPs;
- A consultation process for the Community CCAP that will cost between $75-175,000 and last approx 6 months, plus significant city staff support;
- Another $30,000 for technical expertise to support the consultation process;
- $10,000 in communication costs for just the Corporate CCAP; and
- Many other costs, including significant volunteer time from the Task Force and others.

The process of "implementing" the CCAPs will be significant and last many years. The City has had to hire additional staff to implement the Corporate CCAP, and may face additional staff to implement the Community CCAP. Each project in the CCAP also requires funding in most cases – and while other stakeholders may contribute (Utilities, other governments, volunteer support) a good portion of the costs the City has to pay for.

3. Data Gathered (inventory and baseline)

Baseline: The information to create the emissions baseline / inventory was a challenging process for Vancouver, as they had chosen a PCP / Kyoto-based target, which required a back casting to 1990 emissions levels.

Emissions sources for the years of approx 1995 and 2000 were gathered in a manner similar to other municipalities, and the back cast line to 1990 established primarily from these two points, with appropriate calibration:

- Hydro and Terasen supplied spatial data for electricity and gas consumption as far back as they could which largely defined the emissions from buildings (commercial, industrial and residential); and
- Fuel sales and vehicle kilometres travelled (VKmT) were used to establish fuel use and associated emissions for transportation (light duty and heavy duty vehicles).

Vancouver broke with the PCP protocol in measuring methodologies for travel. The PCP allocates emissions to where vehicles travelled rather than the origin of the trip. Using the PCP protocol, municipalities like Vancouver, Burnaby and New Westminster are allocated the emissions from vehicles travelling from Surrey to downtown Vancouver, although they have few to no policy levers in the GVRD context to reduce these trips. More importantly, Vancouver has been pursuing aggressive mixed-use densification throughout the city to reduce traffic and as a result, growth in local traffic in Vancouver has increased significantly less annually and per capita than in some other GVRD municipalities. Vancouver therefore chose to allocate vehicle-based emissions for light duty vehicles (cars, small trucks, SUVs, etc…) based on the location of ownership, as defined by postal code. Vancouver is not using postal codes for of heavy duty vehicle emissions and rather taking its regional share.

Vancouver's transportation related emissions are based on taking responsibility for all emissions coming from all light duty vehicles owned by residents of the City of Vancouver.

Projections
Vancouver is using a simple population growth estimation for predictions in emissions by residential and transportation sources – estimating increases in those emissions at the appropriate population growth rates as projected to 2010.

Vancouver has experienced significant growth during the 1990s, and continues to experience such growth. As such, by 2010 it is expected to have grown up to 30% - which makes a target of 6% below 1990 emissions levels a challenging task.

Data Challenges
Acquiring data was a real challenge for Vancouver, for dates before the mid 1990s – which was an issue because of the PCP focus on referencing the 1990 level of emissions and for City Council's commitment to try to meet the Kyoto Protocol target – which also references 1990. Several months of work for several staff went into revising the mid 1990s baseline, to get a higher level of specificity, detail and replicability for future monitoring. In some cases, staff close to retirement who knew how to operate very old computer filing programs to acquire data were called to assist.

Transportation emissions became key issues.

- For the corporate fleet, fuel used by city staff in some city vehicles was sometimes difficult to establish because staff would fuel up in various private gas stations and merely submit receipts for reimbursement – often the fuel amounts for many years were not verifiable and had to be estimated with other means.
- The emissions from community transportation was challenging and required cooperation with the GVRD, ICBC and the Air Care program. This information was then cross-referenced with fuel sales in Vancouver and the region for some refinement. The City had to pay ICBC / Air Care staff to gather some of the key data for the City.

Vancouver and the GVRD have met to discuss the emissions measurement challenge to establish more refined approaches to the protocols for future monitoring and reporting. It is acknowledged that emissions reporting may provide support data for other planning processes, such as air quality and regional transportation planning.

It was acknowledged that it is most important to establish a transparent and replicable reporting protocol for emissions to ensure future measurements are done in the same manner as the ones used to establish the baseline, so that progress reports on emissions reduction are accurate and defensible.

4. Implementation and Results Achieved

Implementation Strategy
A proposed implementation strategy has been developed which includes various recommendations. These are summarized below:

Corporate Action Plan
City Council approved the City's Corporate Climate Change Action Plan (CCAP) in Dec 2003 and implementation is underway.

The City's corporate GHG emissions in 1990 are estimated to have been 46,000 tonnes as calculated in accordance with the Federation of Canadian Municipalities' (FCM) protocols. Council has established a target of a 20% reduction by 2010 and thereby, a target of total emissions from the City's corporate interests and activities not to exceed 37,000 tonnes by 2010. This is a *net* reduction of just over 9,000 tonnes. The City is optimistic it can reach or possibly exceed this target.
Key initiatives for city buildings include:
- Implementing energy audits and likely performance retrofits contracts for all city facilities to reduce energy consumption in city buildings;
- Reviewing leases to ensure they support energy savings measures;
- Establishing an energy efficiency equipment procurement policy;
- Purchasing green power certificates for a percentage of City Hall power use;
- Setting a 20% energy efficiency target for new City building construction;

Key staffing initiatives include:
- Hiring an Energy Projects Coordinator;
- Hiring a Coordinator for Civic Employee Sustainability Programs, such as staff transportation demand management;
- Establishing an Inter-Departmental Energy Committee; and
- Exploring incentives for staff to use to reduce energy use;

Key initiatives for the City's fleet include:
- Developing a vehicle purchase "right-size policy and standards" to reduce purchase of oversized vehicles;
- A purchasing policy to delay replacement of some city vehicles and replace them with clean diesels following emissions standards upgrades in 2007;
- Pursuing a biodiesel pilot project, with intent to use biodiesel in the fleet in the future, including putting biodiesel in future fuel contracts;
- A driver training program for fuel efficient driving; and
- Others.

Community Climate Change Plan
The Community Climate Change Action Plan (CCAP) is in draft form at the time of this report in early 2004, and is about to go out for widespread consultation. It has a working reduction target of 6% below 19990 levels (the Kyoto and PCP target). It is hoped that the final plan will be ready for approval by December 2004. The draft plan addresses a wide range of issues, including:
- Significant education and partnership building;
- Increasing energy efficiency of buildings (residential, commercial, institutional, industrial) including both energy efficiency standards for new buildings and pursuing significant retrofits.
- Addressing transportation by implementing current transportation plans, shifting modal priority away from the car, pedestrianizing streets throughout the city, and addressing

the provision of cleaner fuels, as well as many other issues;

- Addressing energy systems throughout the city for increased efficiencies and many alternative and local renewable opportunities; and
- Addressing solid waste management, particularly the continuance and expansion of landfill gas capture.

The following outlines key content and issues from the current "draft" of Vancouver's Community Climate Change Plan. This is a working draft and will be subject to Council approval and significant consultation until the end of 2004. This draft content is included for preliminary reference purposes only.

Buildings
Detached and Non-market Housing Retrofits
***(50% penetration with 30% improvement)** 73,000t reduction and Provincial Energy Act for Appliances 35,000t reduction*

- Promote EnerGuide evaluations and renovation grants
- Promote Do-it-yourself improvements
- Promote turnkey audit/retrofit approach
- Non-market retrofits
- Integrated Marketing "One tonne challenge"
- Corporate Challenge
- Children's programs
- Supplier and contractor awareness and support
- COV, BC Housing, Non-profit housing group Committee
- Lobbying of provincial government for energy efficiency regulations for appliances

Institutional Building Retrofits
(75% penetration with 20% improvement) 35,000 t reduction

- COV commitment to retrofits and new facility energy efficiency standards
- Work with stakeholders, other levels of government, the School Board, Colleges, and Vancouver Coastal Region Health Authority to secure commitment for an Olympic Facelift and to cooperatively identify and address barriers
- Focus on long term interests to make comprehensive retrofits more practical

Medium - Large Commercial Building Retrofits
(35% of buildings improve by 15%) 19,000t reduction

- Build off of GVRD Better Building Partnership
- Increasing energy costs, Kyoto $$, PowerSmart all help make conditions more favourable
- Work with owners and operators to create flexible programs to match budgeting and maintenance cycles
- Promote and showcase retrofits among visible leaders to lead change
- May require incentives/funding

Small Commercial Retrofits
(20% improve by 10%) 6,000t reduction

- Non-"professional" building management, tight margins, cultural barriers make challenging to penetrate and thus require a demonstration of a small commercial retrofit program

- Support Environmental Youth Alliance Green WorkPlace program
- Promote revised lease language to begin to address "split incentive" challenge
- Develop an entrepreneurial approach program to determine efficacy of private turnkey approach

New Building Standards
9,000t reduction

- 25% of all new construction is 25% more energy efficient
- ASHRAE 90.1 (2001) for Multi-family and Commercial Buildings. Currently being implemented in Washington State and will be minimum requirement across US shortly
- Promote use of CBIP - Federal target is 100% participation by 2010. Requires working with developers to understand and address barriers – may require incentives in short term
- Promote building detached homes to EnerGuide 80 standard - Federal target is 100% participation by 2010 in all new homes. Start by working with Province for mandatory labelling. Realistically, this will be relatively small in the scheme of things for Vancouver.

Transportation
Traffic Reduction (10% from BAU) *94,000t reduction*

- Provision of alternatives then aggressive TDM
- Increased transit service is key
- Engage in transit pricing discussion
- Engage in regional transportation pricing/transit funding discussion
- Free up TransLink funding for walking and cycling
- Expand car-coops
- Targeted marketing
- School traffic management and anti-idling
- Employee trip reductions (Transport Mgmt Ass.)
- Integrated climate change marketing
- Offset showcase funding shortfalls

Federal Fuel Efficiency Standards *104,000t reduction*

- The federal government has promised significant increases in energy efficiency standards for vehicles – the City's target for reduction is "Vancouver's national share" of the federal predictions in emissions reductions. The federal government is entirely responsible for this reduction target.

Alternative Fuel Blends for a *27,000 t reduction*
Alternative fuels plays a prominent role in Federal plans And as such, Vancouver will be relying heavily on the federal government to implement the necessary measures to achieve this target.

- 85%+ market penetration of B20 bio-diesel (19,000t reduction)
    - Municipal fleets to lead market transformation to cost neutral B20
    - provincial tax exemption
    - local production using waste oils

- 25% market penetration of E10+ ethanol blended fuel (8,000t reduction)
    - Industry consultation to determine viabilty and steps required.

Industry efficiency improvements and Trucking 21,000t reduction

- Increase Industrial Efficiency 6% (10,000t reduction)
    - Longer term interests and energy intensive processes make efficiency investments more viable
    - Consult with local industry on their plans
- Reduce Heavy Truck Emissions 10% (11,000t reduction)
    - Promote and support driver training program (being developed under Corporate Plan)
    - Additional initiatives in consultation with stakeholders

Energy Systems

Energy systems are seen as important for emissions reduction in the long term, more than for meeting the 2010 target, and proposed actions include:

- Create a Local Energy Strategy for the city;
- Update development policy, protocols and programs, provide support and remove roadblocks to local renewable energy systems;
- Promote pilot projects in local energy systems;
- Undertake coordinated promotion of local sustainable energy systems;
- Explore and develop Eco-industrial Networks throughout the city;
- Explore the opportunities around a Municipal Utility.

Waste Management Systems

Waste management systems focus around the landfill, including:

- Continue to implement the City's landfill gas capture system and expand if possible

Dimensions on Implementation Already Underway

The City has commenced a full implementation of the Corporate Climate Change Plan. It hopes to commence implementation of some aspects of the draft Community Action Plan in the summer of 2004, and start a full implementation in nearly 2005.

Results

It is too early to report or predict results on the progress toward emissions reduction for the City.

5. Integration with other Air Quality Initiatives

The City of Vancouver's approach to these issues involves a dialogue with the following:

- Greenhouse Gas emissions reduction (Climate Change) planning;
- Regional air quality planning;
- Sustainability Action Planning process;
- Regional and local transportation planning; and
- Green development and green building initiatives.

It is not clear whether any one of the above planning initiatives were driven by any of the others, but they are all working together and assisting in both dealing with related issues and maintaining momentum and leveraging resources.

The Sustainability Action Plan will assume an overall framework for many of the initiatives, but it is expected that because of the different stakeholder negotiation tables associated with each, that they will likely remain separate plans.

Integration of these different plans into other community planning and regulatory initiatives include:

- All neighbourhood planning processes;
- Green development and green building policy and regulations;
- Water and waste water management plans;
- Solid waste management plans;
- All aspects of transportation plans;
- Various specific projects, from infrastructure to major neighbourhood planning processes;
- Corporate communications initiatives;
- City facilities planning;
- Capital planning;
- Operating budgets planning – particularly for resourcing city staff teams required to plan and implement these programs; and
- Others.

6. Lessons Learned

Many Costs and Benefits
There are many costs and benefits associated with addressing energy and emissions issues. The city needs to find its best path through these, focusing strategically on benefits and leveraging other programs. Climate Change planning has and is requiring significant funding including staff time, technical consultants and a large consultation team. It also requires significant project management expertise within staff. There is some government money available for projects and possibly some to assist in staffing costs, but it takes time to get that money and it often comes with strings attached.

Expertise
Addressing these issues requires expertise far beyond what most municipal engineering or planning departments have, including hiring new staff and often consultants.

Measurement and Reporting
It was acknowledged that it is most important to establish a transparent and replicable reporting protocol for emissions to ensure future measurements are done in the same manner as the ones used to establish the baseline, so that progress reports on emissions reduction are accurate and defensible.

Vancouver's work on their emissions brought forth a key issue that they intend to work with the GVRD to implement. In order to get accurate transportation emissions, it is the City's and GVRD's intent to request that the province require mileage data to be entered as a prerequisite for auto insurance renewals through ICBC, so that mileage can be cross referenced by postal code for all municipalities in the GVRD, including Vancouver (as well as every community in BC). This information will make transportation emissions reportable on an annual basis with little work.

Benefits to integration
There are many benefits to integration, including:

- The data gathered for any of the plans, informs all the plans (air quality, energy, emissions, sustainability);
- The momentum and learning triggered by one can be built upon with others;
- Staff teams for one are almost the same for the others, and as such, streamlining the plans can streamline staff resources;
- Consultants able to consult on one, are likely knowledgeable on the others, or their work can be easily transferred with some additional work; and
- Others.

Challenges with Integration

Some of the challenges that occur when these plans or processes are integrated may include:

- Sometimes a focus on one issue can build momentum and commitment, where the spreading out of the resources and intent across many can dilute the focus. Vancouver City Council in particular likes the focus on climate change at this time. Vancouver's GHG work has focused Council and staff on many issues such that great progress is being made.
- Sometimes there are conflicting objectives between the plans, primarily between GHG and energy or sustainability. Some initiatives to reduce GHG emissions may not immediately direct energy systems or sustainability priorities in the same way. For instance, using electricity for heating in BC will lower emissions below that used for gas. Another involves using compact fluorescent light bulbs that produce less heat and may therefore increase gas-heating loads in the winter, thereby increasing emissions. Another involves using diesel fuel that until standards are raised in 2007, results in a reduction in emissions, but an increase in harmful air quality particulates.

7. Senior Government Roles/Issues

The City of Vancouver's plans have highlighted a number of areas where senior governments can greatly assist in energy and emissions plans:

- Create a range of incentives and regulatory initiatives to either level the playing field or create encouragement for reduced energy consumption and emissions.
- Deliver aggressively on increases in both fuel efficiency and emissions standards for all vehicles.
- A key thing the provincial government can do is to require ICBC to record mileage for every ICBC insurance registration and to report it annually to respective municipalities based on the first 3 digits of the owner's postal code.
- Providing funding to municipalities to hire an Energy and Emissions Manager for a few years to complete these plans and develop detailed action plans / strategies will be another key role, as most small communities have insufficient resources to hire the necessary expertise to complete these plans effectively. Funding for education / promotion programs would be valuable as well.
- Linking these plans to some infrastructure funding would be very valuable, to encourage municipalities to complete these plans – and providing a clear process and template for it. Encouraging municipalities to participate in the FCM's PCP program will also assist them in getting federal monies for these studies through FCM.
- Promoting clean and bio-based fuels aggressively where appropriate, including lobbying petroleum companies to significantly expand the production and distribution of biodiesel and ethanol fuels, as well as keeping taxes on new cleaner fuels at a minimum.
- Establishing formal "insurable" classifications for new alternative vehicles and modes of transport (such as the Sequay) as fast as possible to permit municipalities to take these up in their fleets.
- Aggressive promotion and provision of incentives for home energy audits and retrofits.
- Promote programs through business associations for small businesses to complete energy audits and retrofits – this group is hard to reach as a general rule.
- Significant increase for funding for transit in municipalities.
- Others are expected to arise as this project proceeds.

8. Contact Information

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References:

- Clouds of Change Report, 1990
- Vancouver Transportation Plan
- Vancouver Downtown Transportation Plan
- GVRD Air Quality Management Plan

- Southeast False Creek Energy Strategy
- Cool Vancouver Task Force Discussion Paper on Climate Change (2003)
- City of Vancouver Corporate Climate Change Action Plan (2003)
- City of Vancouver Draft Community Climate Change Action Plan (2004 – *available to public in later May 2004)*
- Several documents on green buildings strategies and LEED also available on the City's website.

B.6 Case Study: Hartley Bay – Gitga'at First Nation

1. Background

Summary: CEP with consideration of GHG and air quality.

Gitga'at First Nation Community Energy Plan (GFNCEP): A) Stand-alone, B) Single Issue (electricity options)

The Gitga'at First Nation Development Corporation approached the Pembina Institute to conduct a study to explore sustainable energy options for the Hartley Bay community. This evolved into a project to develop a Community Energy Plan. The emphasis of this CEP is on electricity options, although energy demands that are currently met by other energy resources such as wood, propane and oil are also considered. The purpose of developing this CEP was:

- To assess the potential for providing a sustainable electricity system for Hartley Bay;
- To build awareness in the community about energy supply and use;
- To consider economic development opportunities; and
- To recommend the most environmentally and economically appropriate combination of energy supply systems to meet the community's energy requirements.

The extent of the project, however, stretched beyond the completion of the CEP and included a feasibility study for micro-hydroelectricity, and will include completion of the CEP implementation plan (not yet completed).

Spatial Extent
The geographic boundaries of the remote community of Hartley Bay (total population ~250). There are less than 60 residences and major community buildings. The community is not on the B.C. electrical or gas grids and Hartley Bay Power Inc. is the electrical power utility.

Temporal Aspect
The CEP project was launched in spring 2001. The results of the energy demand assessment were presented to Village Council in February 2003. The CEP final report is dated June 2003. The recommended action plan included a targeted commencement date for feasibility studies for summer 2004, so the time required for inventory and planning was approximately 3 years. The Pembina Institute is currently seeking to secure funding to conduct energy efficiency policy work with the Hartley Bay community.

Triggers
In the year 2000, Gitga'at Development Corporation approached the Pembina Institute to undertake an analysis of sustainable energy options for the Hartley Bay community, which resulted in the launch of this project to develop a Community Energy Plan for Hartley Bay. The main concerns expressed by the community were energy reliability and local air quality. The local diesel-powered electricity plant lacked back-up capacity and frequently broke down. The emissions resulting from the combustion of diesel fuel were also a local concern.

Champions
Pembina Institute in partnership with GFN council. Pat Sterritt, chief councilor of the Gitga'at first Nation, was also heavily involved in the process.

2. Planning, Organisation and Funding

Planning Process
The following steps were completed as part of this project:

- Conducted educational workshops at the school and in the community-at-large to raise awareness of energy supply and usage issues in the community.
- Consulted key community members to determine the economic, social and environmental objectives surrounding energy use, economic development priorities and associated energy requirements, and potential constraints to the development of a mini-hydroelectricity system.

- Developed an energy demand assessment for Hartley Bay for a 20-year period from 2001 to 2021.
- Calculated the current financial cost of imported fossil fuels and their resulting emissions.
- Undertook a stream hydrology study on the Gabion River to determine the magnitude of its energy resource.
- Undertook an assessment of energy efficiency and demand management options.
- Conducted a comparative analysis of various electrical generation options.
- Recommended priority energy supply and energy efficiency options for the community.
- Developed an action plan and next steps to move towards implementation of priority options (i.e. this report).

Key People Involved
- Andrew Pape-Salmon – Director of Sustainable Energy at Pembina (at the time of project)
- Tim Weis – member of the Community Eco-Solutions team at Pembina
- Sigma Engineering

Committees
A project advisory committee was proposed to guide project direction, advise the Pembina Institute and maintain a link with community leaders. Members were: Elders, chief in council, energy operators (Hartley Bay Power Inc.), INAC, community development interests and environmental groups.

Funding / Costs
In 2001, the Hartley Bay Band Council submitted a funding proposal to the British Columbia Greening Communities Initiative of the former Ministry of Community Development, Cooperatives and Volunteers, which resulted in the launch of this project to develop a Community Energy Plan (CEP) for Hartley Bay. The total funding required was $50,000 (from proposal). Due to the nature of these funding sources, they typically require some funding from community. Funds were allocated for creek flow monitoring but not for any implementation initiatives. Final action plan recommendations point to further funding options and next steps/studies.

Consultations
During a community consultation, The Pembina Institute focused on addressing the following four major issues (GFNEP, p. v):
1. The cost of energy to the individual community members and the community as a whole.
2. Community growth objectives, including expansion of residential areas and economic development.
3. Social issues such as local employment opportunities, degree of local control over the management of energy systems, community self-reliance and energy usage for residential and commercial uses.
4. Environmental issues such as air pollutants, including greenhouse gas emissions, local air pollutants, noise emissions, and toxic wastes and impacts on local flora and fauna, particularly aquatic life.

More specific guidelines for the scope of the CEP resulted from the consultation, but are, in general, similar to the above issues. GHG/AMP related guidelines were:
- The energy system should aim to minimize impacts on the global climate by minimizing the emissions of greenhouse gases and therefore contribute toward a worldwide effort to prevent further changes in climate.
- The energy system should aim to minimize local air emissions that could have an impact on community members' health.

Key Stakeholders
Key community members, including elders, youth, business owners (e.g. Hartley Power Inc) and traditional and elected leadership. The chief was also involved in the process.

Consultation Tools to Involve the General Public
- Educational workshops at the school and in the community-at-large to raise awareness of energy supply and usage issues in the community.
- Public consultation sessions

How was Consultation Achieved?
- Presentations at public meetings ("public energy information sessions")
- Public consultation sessions – community members, including elders, youth, and traditional and elected leadership, expressed priorities and objectives surrounding energy

supply and use.
- Community workshops
- Household energy use surveys (distributed to those who attended the public energy information session and to students at the school)
- The most significant consultation occurred on April 20, 2002 during a multi-day community forum on land-use issues where a discussion on energy was added. (GFNEP, p. 5)

3. Data Gathered (inventory and baseline)

Source: Gitga'at First Nation Community Energy Plan, p. 88-89.

An assessment of the community demand for energy was necessary to determine the required capacity of energy systems being considered for the CEP. Energy demand included the use of electricity, as well as the energy consumed for water and space heating. It did not include the demand for transportation fuels, such as gasoline and diesel for boats or airplanes.

Baseline Data

The year 2001 was used as the baseline year. The energy demand assessment includes residential dwellings (63 houses in 2001), as well as 19 non-residential buildings, including the Community Hall, Hartley Bay school, Hartley Bay Band Office, carving shed, Memorial Centre, church, nursing station, Telus building, Fuel Station, Fire Hall, RCMP building, street and dock lights, water treatment plant, fish hatchery, sawmill warehouses, storage building, lift station, septic tank and power plant.

Inventory Process

The Pembina Institute developed an estimate of household electrical demand by comparing the results of three independent data collection methods:
- **Household surveys:** Community members completed a survey that inventoried the types and numbers of appliances present, and how often they were used. Average values were used for appliance loads, and annual demand was based on the number of hours listed for each appliance for each home. The surveys also determined the energy sources that community members use for water heating, space heating, cooking. Surveys were not used for the non-residential community buildings in Hartley Bay. Non residential electricity consumption was based on the data collected from reading the power meters. For the current study, survey results did not include fuel oil, propane and wood consumption for non-residential buildings.
- **Fuel purchase records:** Fuel purchase records were collected from All Things Energy, the sole community supplier of fossil fuels, to determine the volume and cost of diesel fuel, propane and fuel oil to the community. To determine the amount of electricity generated from the diesel fuel purchases a conversion efficiency of 0.37 L/kWh was used. This efficiency was verified by the power production records from the diesel plant, which log the power output and the overall power produced once a day. The power plant records were also used to estimate a peak load for the community by finding the highest recorded power output in the logbook.
- **End-use power meters:** Monthly power records were collected from each residential and non-residential building in the community. This data provides only the annual electrical power consumption and provides no information about the community peak load.
- **Creek flow monitoring:** River flow volumes were recorded. Data collection must occur for one full year.
- **GHG calculations:** Using accepted chemical equations, GHGs were calculated based on fuel consumption.

Challenges in Data Collection

Communication and continuity were challenges throughout the process. This was largely due to the remote location of the community. Also, reliable creek flow data and quick survey turnaround presented challenges.

4. Implementation and Results Achieved

The following next steps were recommended for advancing the implementation of the preferred energy supply option but have yet to be implemented:
- Community consultation on energy supply options to ensure that community members are involved in selecting the preferred option. This would include open houses, further community consultation and information sessions.
- Council decision on preferred option following consultations (e.g., hydroelectricity).
- A proposal could be made to Indian and Northern Affairs Canada to fund the feasibility study for the preferred system.

- Completion of a detailed feasibility study and business plan for the preferred energy system, including the following components:

  - Technical feasibility
  - Resource availability
  - Environmental impacts (e.g., Fisheries studies)
  - Proposed business structure
  - Proposed pricing system and system for low-income support
  - Proposed project financing.
  - Project financing could be pursued upon completion of the feasibility study. Sources could include INAC, debt financing from banks, equity investment partners, and/or grants to cover part of the project cost. Targeted commencement in summer 2004.
- Permits will be required for water and land use through Land and Water BC.
- Once financing and the business structure is established, project implementation could take place, including detailed engineering, logistics planning, construction and system commissioning.
- A concerted effort should be made to promote individual energy efficiency. Such a program will not only save individual community members money on their monthly electricity bills, but will also minimize the amount of diesel fuel required for the diesel plant whether it is used as a primary or backup electrical supply. Pembina went further to recommend that the Gitga'at First Nation consider implementing an energy efficiency program in collaboration with the Pembina Institute and with the federal government energy efficiency programs.
- Consider gradually implementing consumption-based energy charges and an aggressive energy education program.

The Pembina Institute is currently attempting the secure funding to complete energy-efficiency policy work with the Hartley Bay community.

5. Integration with other Air Quality Initiatives

Although air quality and GHG considerations were referenced in the plan, they were not fully integrated into the community energy planning process nor were they considered to the depth they would be considered in typical AMPs or GHG Action Planning processes. However, air emissions and GHGs were calculated to compare energy options and were considered as impacts to the environment. Therefore, broad community air quality and/or GHGs issues, sources and/or concerns were not considered directly or explicitly during this planning process.

6. Lessons Learned

Communities and municipalities, in general, have difficulty accessing information and funding for energy-related initiatives. Communities of the scale and remoteness of Hartley Bay have even greater challenges than most. Initiatives reviewed in this effort included a micro-hydro power station. Again, the capital resources required for projects of this nature are prohibitive for most and especially prohibitive for a community of this size.

Communication and continuity were a challenge in this project. For example, part way through the CEP process, a new diesel-fuelled power plant arrived for the community's use. This was not only a surprise for the Pembina Institute, but also a surprise for some of the community members involved in the process.

In remote communities such as Hartley Bay, energy costs and reliability are generally much larger concerns that climate change or air quality concerns and therefore there is little appetite to address air quality or GHG issues unless they are synergistic with initiatives to improve energy reliability and cost.

7. Senior Government Role and Issues

Information not obtained.

8. Contact Information

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References:

Pembina Institute. 2003. Gitga'at First Nation Community Energy Plan: Options for Energy Supply and Management for Hartley Bay, British Columbia. Prepared for Gitga'at First Nation Development Corporation.

B.7 Case Study: City of Kamloops

1. Background – CEP, GHG Action Plan, AQ Initiative

Kamloops is one of British Columbia's larger communities, with 80,000 people in 1997, but is considered a mid-sized community in comparison across Canada. The city had already grown rapidly since 1990 with 1800 new residents per year moving to the city. A 1997 growth projection forecast a potential population increase of 45,000 new residents by 2022. In 1990, Kamloops approved their first Official Community Plan (OCP). In 1997, the City developed the successor 'KAMPLAN 1997' as a growth management strategy to set policies and guide City Council and the community into the next century. This 1997 plan included environmental goals, a Community Energy Plan module and was primarily created to preserve or increase the city's health and the residents' overall quality of life through continued population growth and urban development. The execution of KAMPLAN 1997 earned Kamloops a Sustainable Community Award from the Federation of Canadian Municipalities (FCM) in 2000. The KAMPLAN is currently being updated (in 2004) and the Community Energy Plan module is being integrated into various parts of the plan rather than the CEP being identified as a separate part of the plan. TravelSmart is also an influential companion program to KAMPLAN, in terms of land use planning influence and community energy use.

Community Energy Plan (CEP) - *A comprehensive plan as a component of a broader initiative (the OCP)*

- Launched in 1996; Kamloops is one of the first of BC's larger communities to develop a systematic, energy-focused view of its operations
- Included a comprehensive portfolio of policies and actions with topics from alternative fuel use to energy management protocols, from energy modeling to subdivision planning, for both municipal and community energy actions
- Underpinned by energy-efficiency principles and supported by a sound energy management culture of the city
- Driven by cost savings, environmental benefits and liveability goals
- Visionary plan at the time, including co-generation, use of waste heat and sub-hub community design; however, full implementation has been impeded in part by the lack of identified City representatives to be responsible for monitoring and reporting on performance and achievement of each task/ goal

Greenhouse Gas Action Plan (GHG Action Plan) - *A comprehensive plan as a component of a broader initiative (the OCP)*

- Launched in 1997 to implement the FCM's Partners for Climate Protection (PCP) program in Kamloops
- Committed the city to reduce its 1990 levels of GHG emissions by 20% by the year 2005
- Milestones 1 and 2 are complete and the CEP is being reviewed for application to meet Milestone 3 (a Local Action Plan)

Air Quality Initiative (AQ Initiative) - *A yet-undeveloped plan as a component of a broader initiative (the OCP)*

- Identified potential for air quality issues in the community and some actions have been pursued, but as of yet no formal plan or budget developed

2. Planning, Organisation and Funding

Kamloops' Official Community Plan (OCP)

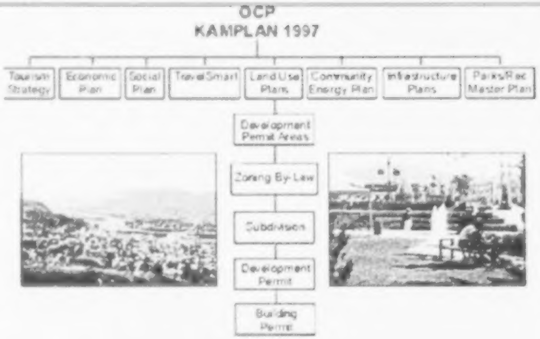
- Is a broader initiative under which the CEP and GHG Action Plan are components
- Summary diagram to the right shows community initiatives falling under the OCP in the 1997 organization
- OCP planning process was an two-year process including extensive public involvement with input from city residents, an Advisory Planning Committee, business groups, Kamloops Social Planning Council, and neighbourhood associations
- Every five years the OCP is reviewed and updated through a public review process to hear as many views as possible about the physical and social development of the community
- To execute on the OCP, the following teams were assembled:

Community Planning Section:

- Focus on future growth of the city through the OCP, neighbourhood planning initiatives, and social planning through the Social Planning Council.

Environmental Committee:

- Monitor and measure environmental performance in terms of regulatory compliance and accountability to the public;
- Continuously reduce the impacts of City operations;
- Evaluate and integrate long-term economic, environmental and social costs and benefits into City plans;
- Accelerate the adoption of more sustainable practices by Kamloops businesses, institutions, households and citizens;
- Effectively communicate goals, activities and accomplishments.
- TravelSmart has also influenced land use planning by triggering analysis of access to community services, walking distances, etc.



CEP

- Funded in 1996 through the B.C. Community Energy Association (CEA - at the time, called the B.C. Energy Aware Committee), in part because the OCP was due to be renewed and could be co-developed and integrated with the CEP; the CEA was looking for a partner to pilot a comprehensive community energy approach and plan development; TravelSmart was also taking place as a parallel program with many synergies; at the time, the Director of Engineering Development and Public Works championed and lead the CEP.
- Some key CEP initiatives planned include a performance points system, density guidelines, alternative fuel in fleet vehicles, joint water/energy retrofits, street orientation design guides, district energy zoning, boiler and HVAC retrofits, and energy audits
- **CEP development process** included:
  - Developing energy-related objectives for the City that would help to meet the community objectives of the OCP;
  - Identifying strategies for achieving these energy objectives and supporting broader community goals;
  - Establishing the City's approximate baseline energy use;
  - Computer modelling and evaluation by consultants and City staff of energy implications of alternative development scenarios for OCP process;
  - Developing an action plan to meet the energy objectives, establishing monitoring and management protocols to evaluate the actions and to ensure the continued relevance of the plan.
  - Cost was approximately $70,000 capital investment plus staff time and the in-kind time of numerous stakeholders
- **CEP Stakeholder Group**:
  - Set up to guide development of the CEP
  - Included a broad cross-section of energy utilities, provincial ministries, City staff and school board, business and industrial representatives, native representatives
  - Workshop held to select a preferred development scenario from an energy perspective, and to screen and prioritize CEP action items

GHG Action Plan

- Supported by FCM
- The 1997 commitment to PCP to reducing both municipal operations and community-wide GHG emissions by 20% below 1994 and 1990 levels, respectively, by the year 2005
- A 48% reduction in energy use is needed to meet the corporate energy reduction target
- PCP milestone progress is as follows:
  - **Milestone 1(a): Inventory** (Complete) - Profile energy use and emissions for the base year of 1994 for municipal operations, and then for emissions community-wide; compare to emissions in 1999.
  - **Milestone 1(b): Forecasting** (Complete) - Forecast energy use and emissions for municipal operations, and then for emissions community-wide.
  - **Milestone 2: Establish a Reduction Target** (Complete)
  - **Milestone 3: Develop a Local Action Plan** (In Progress) - Develop and finalize a local action plan that aims to reduce emissions and energy use in municipal operations first of all, then expand to reduce emissions in the community. This local action plan will also incorporate public awareness and education campaigns. The CEP is being reviewed because it matches up very closely to the requirements for Milestone 3.

- **Milestone 4: Implement the Action Plan** (Future Work) - Begin implementation of the local action plan and measures that will reduce GHG emissions.
- **Milestone 5: Monitor and Report** (Future Work)

Air Quality Plan (or Airshed Management Plan)

- Kamloops has worked with the province on an Air Quality Primer to inform the public about air quality issues and prevention measures (reduce idling, for example)
- Potential airshed monitoring data sources have been identified at the provincial, federal and industrial levels
- Preliminary discussion of some partnership opportunities have taken place (a local university is interested in partnering/ contributing to airshed planning; local concrete and pulp & paper industries have been engaged to reduce their GHG emissions and air pollutants.
- Kamloops plans to establish an external advisory committee once air quality planning gets underway.
- No budget envelope or staff resources have been identified to date
- Kamloops plans to use an integrated approach (working title is ACE – Air, Climate and Energy)
- The Whistler model for integration of air issues with other processes is being looked at as a model

Other

- **Environmental Management System** (EMS): Kamloops is developing an EMS system for its operations; this is expected to assist in CEP and GHG efforts for corporate energy and emissions because it will provide a systematic decision-making framework for consideration of environmental impacts
- **LEED**: The LEED building standard was applied to design a new water purification plant; a ten point LEED Action Plan was a very practical and tangible tool to use to get on-the-ground results; LEED may serve as a model for development of practical check-list type tools for other infrastructure energy or emissions reduction

3. Data Gathered (Inventory & Baseline)

CEP

- The last energy audit was done in 1999
- According to the CEP analysis, the largest energy users in Kamloops are transportation (60% of total energy) and buildings (30%)
- Several models were used for various energy use sectors to develop the CEP, including community energy modelling for development densities, and transportation modelling development densities
- GIS (geographic information system) modelling established the baseline energy use of both the City as a whole and of a typical subdivision zoned for future development
- Various development scenarios were modelled to judge the effects of major planning decisions on the area in terms of cost, environmental and social impacts; it also compared various "neighbourhood" subdivision development scenarios.
- Contracted services were used to undertake modelling for the CEP

GHG Action Plan

- Requires baseline and projection data
- Resources used included the CCP software tool and a student; completed the inventory for corporate emissions based on good energy use records from operating departments; the community emissions inventory was based on numerous, well-documented assumptions
- The emissions baseline, required by Milestone 1 of the PCP program, is more detailed than the energy baseline that was estimated for the CEP
- Buildings were identified as the largest energy user according to the GHG emissions analysis (different from the CEP analysis).
- Emissions profiles vary with variation in the provincial energy co-efficient (i.e. hydro-fuel mix of the utility); energy use can increase but emissions still decrease; this can cause difficulties in explaining results to politicians and other laypersons
- The CCP treatment of green waste in landfills (i.e. credits for landfilling compostables) is questioned by Kamloops
- Consideration is being given to modelling GHG emissions every year to develop better trend information, given co-efficient and energy use variations
- GHG emissions tracking is most important for trends and relative differences (versus absolute numbers, which are based largely on estimates)

4. Implementation & Results Achieved

CEP

- Since an energy audit has not been done since 1999, there has been no quantified evaluation of the CEP results
- Also, there were no performance metrics established at the time of the plan for implementation performance assessment so monitoring and reporting on results have not taken place
- Although successful in many ways, there remains a perception that the CEP "failed" to be implemented; a few key initiatives that had specific emphasis failed to get off the ground; however, a CEP review process in 2000 revealed that many of the actions in the plan had been fully implemented or comprehensively investigated, primarily by City staff; on the other hand several of the CEP's key proposals have not been implemented or investigated several years after its publication
- Many action items are still providing inspiration and there is an umbrella view of energy use where City energy use is monitored against an established baseline, so Kamloops can be said to be undertaking "community energy planning"; however, it cannot be claimed that the actions that contribute to the goals of the CEP are necessarily undertaken in the name of the plan, or necessarily mindful of it
- In the Kamloops experience, a commitment to the environment does not necessarily lead to a commitment to a CEP
- The CEP provides very high level goals but more linkages to day-to-day decisions are needed to operationalize the plan.
- There was good staff support for the CEP, but key staff at the City were not designated to implement the plan; rather, the plan was developed through a stakeholder committee process that resulted in a low level of ownership and accountability for the plan implementation
- A cohesive implementation plan with performance metrics and accountabilities for implementation, monitoring and reporting was needed.

GHG Action Plan

- Quick-start initiatives included installing energy-efficient lights in City buildings and streetlights, adding alternate fuel vehicles to the City fleet, office paper management, bulk washer fluid purchasing, recycled motor oil, antifreeze, and batteries, and the City's WaterSmart program
- Payback period on capital investments to improve energy efficiency was often short, and savings were reinvested in the community
- The CEP is being considered for application as the Milestone 3 plan.

AQ Initiative

- The Pollution Prevention Newsletter was created to help educate residents
- No plan established or associated implementation to date

5. Integration with other Air Quality Initiatives

OCP & CEP

- OCP was developed alongside CEP and published shortly after; TravelSmart is also a concurrent program
- Energy policies identified by CEP are reproduced as a separate chapter in OCP (this is currently being changed to incorporate CEP into OCP)
- OCP includes the following key planning goals, all of which are consistent with sound energy management:
    - encouraging infill and intensification;
    - discouraging urban sprawl;
    - guiding new development to cost-effective and pre-serviced growth areas;
    - bringing shopping, work and home closer together;
    - encouraging a mix of housing types and density; and alternate transportation systems (walkways, transit, bike paths and ride sharing)

GHG Action Plan

- Since the City is ready to develop a Local Action Plan for step 3 of the PCP process, it is currently trying to integrate the working elements of the CEP with the PCP program (GHG Action Plan)
- This will provide an elegant and practical way of overcoming barriers to implementation of the outstanding and worthwhile aspects of the CEP, since it:
    - levers the benefits of an existing, successful organizational structure (responsible for implementing the PCP program);
    - ensures an umbrella view of energy activities;
    - increases efficiency and productivity, since greenhouse gas emissions correlate with energy consumption
    - will have direct exposure to Council, increasing the potential to justify proactive measures to reduce energy use;
    - will act as both an internal communications conduit and a feedback mechanism to the various City departments;

- is supported by all participants.

6. Lessons Learned

Some key CEP lessons learned (from CEA Case Study):

- **Keep it Personal** - Need a sense of ownership from those who will implement it. Too much external involvement may be counterproductive (including excessively influential developmental input from parties unwilling or unable to subsequently contribute to implementation).
- **Avoid Duplication** - Where possible, integrate the plan with parallel programs (e.g environmental management systems, sustainability indicator tracking programs etc) to improve efficiency, data consistency and relevance.
- **Nurture Organizational Links** - A CEP thrives on partnerships between municipal, utility companies and other organizations, and depends on active engagement from all sides; need for partners to recognize each others' needs, skills and resources and continuously working together towards common goals.
- **Don't Reinvent the Wheel** - It may not be necessary to develop monitoring programs specifically for energy activities. Using existing or off-the-shelf tools, such as those offered by the FCM, saves time and resources.
- **Don't Totally Rely on Individual Champions** - Although champions can be invaluable in making change happen, ensure that the knowledge and policies contained within CEPs are effectively institutionalized to ensure they will withstand changes to staff and local government officials. This includes greater integration of energy priorities throughout the OCP.
- **Integrate CEP-tracking measures into the City's regularly reported key performance measures**.

7. Senior Government Roles/ Issues

Data sets and Reporting

- Current reporting requirements (and imminent requirements) for NPRI, PCP, VCR should be coordinated through government partnerships
- Airshed monitoring agreements and data-sharing could also be established with municipalities as partners

Tools to Assist Municipalities

- Check-list to assist with assessment of current situation in terms of existing plans, resources, capacity to undertake air issues
- Guidance on government assistance available for air issues planning and community sponsorship opportunities (to undertake energy audits, for example)
- Guidance on "easy" first steps – such as energy efficiency standards for major capital investments (in new buildings, for example)
- Check list of energy or GHG emissions considerations similar to the LEED format for buildings to be applied to roads or other infrastructure; something very tangible and simplified rather than largely conceptual
- Primer on (or access to) social-marketing concepts to make the linkages from land use to transportation to energy use more clear for community-wide initiatives

8. Contact Information

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B.8 Case Study: City of Quesnel

1. Background

Summary: CEP and Air Quality Initiative.

The City of Quesnel is dominated by the forest resource-based industry and recent challenges in this sector have led to a declining population. Three quarters of the City's GHG emissions and the majority of common air contaminants are produced by the City's industrial forest products sector which includes 2 pulp mills, a plywood manufacturer, a particle board manufacturer and sawmills. Energy consumption in the community is rising, in part, as a result of increased energy use for space heating. Health concerns around poor air quality and the City's interest in addressing energy-related concerns such as rising energy prices have led to an Air Quality Management Planning Process and the foundation work for a CEP. These planning processes have been completed largely in isolation but the CEP work has noted synergies between the two. Quesnel recently joined the PCP program, but has not yet completed Milestone One.

Air Quality Planning: A) Standalone Plan, B) Comprehensive.
In December 1999, triggered by increasing concern over health and visual impacts of poor air quality, a community-driven Airshed Management Planning process was initiated in Quesnel to study the local air quality problem and make recommendations to improve air quality in the community. Spearheaded by the Quesnel Environmental Society (QES), a community roundtable was formed. The Roundtable, with MWLAP's help, led a funding drive while QES secured industry, labour, and community participation. The planning is being done in collaboration with neighbouring Williams Lake. Both communities formed their own air quality management committee and they have identical frameworks for the final Air Quality Management Strategy. The Williams Lake process deliberately lags the Quesnel process by one year so that lessons learned from the Quesnel process can be applied to William's Lake. This analysis pertains to Quesnel's work on this planning process. This process pertains to the geographic area of the Quesnel Airshed defined by topography and meteorological patterns.

MELP created a framework for Airshed Management Planning in Quesnel and Williams Lake from 1999 to 2005. The framework consists of 3 phases:

- Phase I: Planning and Monitoring (16 months);
- Phase II: Model Refinement and Air Quality Management Strategy (24 months);
- Phase III: Evaluation of Management Measures and Long-term Trends (20 months)

The aim is to have a complete draft Air Quality Plan by May 2004.

Triggers
Both communities have had historically poor air quality, including some of the highest levels in B.C. of fine air particulates (i.e. PM10). Concerns about the physical (e.g. respiratory health) and economic (value-added forest sector and tourism) health of these communities due to local air quality have led to this planning process.

Key Community Objectives Driving the Process
Concerns that the local air quality will negatively affect local tourism by a) discouraging visits by those that seek clean surroundings and b) making difficult promotion of the town as an affordable and attractive retirement community. In addition, the forestly-depedent community faces the challenge of feconomic diversifficantion, and is trying to expand its range of value-added forest products from its traditional emphasis on pulp and dimensional lumber..

Project Champion:
Local environmental groups, industry representatives, and municipalities established the North-Central Round Table for Airshed Management, which gathered community support and funding commitments for air quality management. The roundtable proposed an Airshed Management Plan that addressed problems by measuring all inhalable particles on a continuous basis, identifying sources of pollutants and reducing overall particulate levels through a strategy that includes community consultation.

MWLAP plays a technical support role and there is a strong link with its role as regulator of the 33 permitted industries, which includes sawmilling, plywood manufacturers, 2 pulp mills, and one beehive burner (now phased out).

Linkages with Existing Municipal Policies or Other Initiatives
Will likely influence, or be influenced by, Town Council's passing the resolution to move forward with FCM PCP milestones framework.

Community Energy Planning: A) Stand-alone Plan, B) Comprehensive.
The City of Quesnel has recently worked with the BC Community Energy Association and the Pembina Institute to develop the City of Quesnel Community Energy Options Report, 2003 (CEOR). This report provides the "building blocks for Quesnel to develop a community energy plan" but falls short of a full CEP in that it doesn't commit to a series of actions and has yet to be supported through a public consultation process. Development of a full CEP is one of the key recommendations of the report.

Given the focus of Quesnel's latest OCP on policies to reduce the city's energy consumption and the extensive amount of work completed on air quality management in the region, the CEOR serves as a foundation document for strategic next steps around energy and emissions. The CEOR focused on future community energy planning but makes the link to synergies in air quality and GHG action planning efforts. The CEOR provided energy planning-related background information and went further to provide goals for a city-led CEP process.

Spatial and Temporal Extent
The geographic extent was the municipal boundary of the City of Quesnel. The CEOR was initiated in 2001 and completed August 2003. Implementation will be on-going for some time.

Champions
Councillor Mike Doyle was one of the main champions for this project. Mike also sat on the Air Quality Roundtable which provided an important link between the CEP and Air Quality processes. The process was also championed by the BC Community Energy Association (CEA) and the Pembina Institute.

Linkages with Existing Municipal Policies or Other Initiatives
The CEOR identifies several local processes compatible with Quesnel's CEP initiative. They are:

- Planning of Transportation Infrastructure and Improved Transit in recent Official Community Plan (1999) (OCP)
- Quesnel Air Quality Roundtable
- Quesnel Community and Economic Development Corporation
- Quesnel PowerSmart Initiative
- Bike Paths
- Quesnel Transit System
- FCM PCP
- OCP forthcoming review (to be updated in 2004 calendar year)
- Quesnel Downtown Plan

Quesnel's OCP, which has been highlighted by CEA's Toolkit for Community Energy Planning in B.C., contains a number of policies aimed at gradually increasing density and reshaping the urban mix of commercial and residential areas. The document aims to reduce vehicle emissions (from a shift to pedestrian, cycling, and public transit modes of travel), reduce costs of transit, and improve downtown business viability. Historically the City developed in a compact fashion with smaller, higher density lots in close proximity to amenities, making it a walkable city. However, recent development has been more suburban with larger lots and this has presented a challenge to the viability of transit and energy efficient urban form. The City is currently is currently attempting to create a network of bike paths to encourage more cycling in the area.

2. Planning, Organisation and Funding

Airshed Management Planning
Key People: Dora McMillan, Chair, Quesnel Air Quality Roundtable, Norm Zirnhelt, Earle Plain, MWLAP (Cariboo Region)

Committees
A multi-stakeholder committee (Quesnel Air Quality Roundtable) oversees the Airshed Management Planning process. The Quesnel Environmental Society chairs the committee

which includes representation from several organizations including municipal government, environmental groups, provincial ministries, industry, businesses, neighbourhood association. There is also a subcommittee looking at road dust issues. Originally, there was a region wide roundtable, which later split into two roundtables one for Quesnel, one for William's Lake.

As part of Phase I, the **Air Monitoring and Assessment Strategy for Quesnel BC, 2000-2005** includes the following steps:

- Prepare and implement preliminary interim steps to improve local air quality
- Preliminary scoping exercise to identify relevant questions, level of acceptable uncertainty, and potential tools
- Report on current status of local air quality. Identify priority contaminants, major sources, data gaps.
- Prepare and implement an ambient air quality monitoring program
- Conduct a source monitoring program
- Use dispersion modeling techniques to identify source contributions during PM_{10} episodes

Based on the above work, they will identify priority contaminant sources for management action, select management options, and prepare the Airshed Management Plan (Phase II)

Stakeholder Consultation
As part of Phase I, they:

- Developed a brochure to introduce the concept of airshed management planning to the public.
- Conducted a public open house to present the Airshed Management Planning process and to introduce members of the Air Quality Management Committee to the public
- Once computer modelling is complete, results were presented to the public.

There has been a very high level of participation. Lots of different sectors have been involved which led to a very exciting process. Input from roundtable has been extremely useful. Process has led to great increase in the understanding of air quality issues, including technical issues. The public will be invited to provide input to the draft plan in the Spring/Summer of 2004.

Costs/Funding
The total cost of the five-year plan is $957,500. MWLAP funds close to 60% with staffing, air monitoring, equipment and by providing $37,500 per year for five years to cover a shortfall in the plan budget. Other support came from Human Resources Development Canada ($100,000 over two years), Cities of Quesnel and Williams Lake ($105,000 each over 5 years), the Cariboo Regional District ($25,000) and Cariboo Health Services ($25,000 for each community).

Community Energy Planning
Planning Process: The CEOR outlines goals for the Quesnel CEP as well as recommended next steps in the planning process. The process was driven in part by local councillors and in part by the Community Energy Association and Pembina Institute.

The CEOR:

- Set goals for the Quesnel CEP;
- Presented an emission baseline for energy consumption, energy costs, GHG and air contaminants emissions. (Note: a complete inventory of Quesnel's GHG emissions from municipal operations is not included in the project);
- Set out a range of possible GHG reduction targets;
- Reviewed the energy-wise land-use and development policies in the current OCP;
- Presented potential action for energy efficiency and renewable energy; and
- Provided recommendations for next steps in the CEP process

Key People

- City Council articulated a statement of 'community objectives' in July 2002. (CEOR, pg.1)
- City Council held several discussions regarding joining FCM PCP. (They are now listed on the FCM list of participating communities, but no progress to date.)
- City Councillor Mike Doyle worked with Community Energy Association to kick-off a CEP process

Stakeholder Consultation
Reports were presented at public meetings. There was not much consultation except with local industry (big energy user). However, public consultation is recommended in the CEOR as part of the development of the full CEP.

Costs/Funding
The CEOR report received funds from the City of Quesnel and BC Hydro with matching funds provided by the Climate Change Action Fund. The Community Energy Association provided in-kind contributions. The budget ($approx. $20,000) was quite small for the scope of work required which included a baseline study. As outside consultants, Pembina was reluctant to do a full CEP without a full community consultation process which would have required a larger budget. With a larger budget a municipal inventory would also have been completed.

3. Data Gathered (inventory and baseline)

Airshed Management Planning
Extensive work has been completed up front developing detailed modelling and assessment of the Airshed. The main focus of the inventory was fine particulates (PM10 and PM2.5). The Provincial emissions inventory data was scaled to Quesnel. Lots of effort went into fine tuning the emissions inventory to make it accurate for Quesnel. This work is now finished and will form the basis for developing the plan itself.

Data needed to plan the program included:

- Refined existing emissions inventory for fine particulates in the Quesnel Airshed
- Concentrations and constituents of fine particulates that contribute to high ambient values in residential areas of the Airshed
- Seasonality and sources of constituents
- The constituents / concentrations attributable to various sources in the community
- Natural versus anthropogenic sources and activities
- Other parameters of interest (odour, ozone, nitrous oxides, CO_2, SO_2) and their link to sources

Inventory Process
During the Installation Phase (completed early 2001) new air quality monitors were installed and began collecting data on fine particulates at various locations around the city. This new information is being supplemented by WLAP's air quality measurements taken over the past 10 years. The Roundtable also listed all emission sources in the city that impact air quality. MWALP's Air Quality Meteorologist developed a computer dispersion model (CALPUFF) to show how various emissions affect different parts of the city.

In Quesnel, the biggest contributors to CACs are point source emitters. The permitted emitters were mapped in a very detailed way. This included a GPS location and stack heights and these were used to develop the computer dispersion modelling.

Community Energy Planning

Baseline Data:
Before the study Pembina prepared the City of Quesnel Energy and Emissions Baseline Report (Nov. 2002). This report contains a broad range of data concerning energy use, energy costs, GHGs, and common air contaminants in the years 2000 and 1996 for activities within the current City boundaries, and includes major industries in the immediate surrounding area. In accordance with PCP practices, this baseline includes the GHGs associated with electricity consumption within the City boundaries even though the electricity may have been generated outside the municipal boundary. This data will be used for Milestone 1 of the PCP program, once Council passes a resolution to become a member. The baseline was prepared by calculating total energy consumption, calculating energy costs, calculating and using emission factors to calculate GHG emissions and CACs. The baseline work included a survey of major industrial users and analysis of aggregate utility data from BC Hydro and Terasen.

4. Implementation and Results Achieved

Airshed Management Planning
While the AQMP has to be agreed to by the Roundtable and go through a public consultation process, it is anticipated that the following preliminary goals and results will be

included:

- Woodstove swap program (2002). A total of 76 old woodstoves were exchanged for US EPA emissions certified stoves that burn 1/3 less wood and reduce emissions by 90%. Estimated to reduce emitted smoke, ash and other gaseous compounds by 3,800 kg. Also contributed to public education about the topics of local air quality and wood smoke compounds.
- The road dust committee – using coarser, cleaner materials for sanding haul roads
- The City looking at ways to improve spring cleanup to reduce dust. Traction material left on the road is a problem. Need wet sweeping, road paving, drainage improvement.
- Phasing out of beehive burners
- Onus on permittees to provide a pollution prevention plan – participating industry (most have been involved) have agreed to this.
- Co-operation of City and Regional District will be needed to regulate woodstove burning and backyard burning.
- Slash burning will only be done under really good venting conditions
- Recommend clean up of sawmill – fugitive dust – primarily PM10 but also contributes to PM2.5
- Explore idea of east-west connector and (bypass) – reduce grade, stopping and starting to take logging trucks out of downtown.

The AQMP will likely result in economic benefits such as:

- Increased tourism
- Faster approvals – The sophisticated air shed model (meteorologist can model influence very accurately) could be used for EA process very quickly. It is possible to identify areas where industry will have the least impact on air quality.
- Make the community more liveable – could possibly attract more retirees and therefore encourage development.

Community Energy Planning

The CEOR process revealed community goals which became suggestions for CEP objectives. They are:

- Assist economic development and diversification
- Improve air quality
- Stabilize or reduce energy costs to citizens, municipality, industry and business
- Enhance the downtown core

Increase energy and economic security (i.e. reduce the need for energy imports and increase the reliability of supply)

Next steps identified by the CEOR for the CEP include:

- Completing the baseline inventory for the municipal operations of the City of Quesnel;
- Pre-feasibility studies for specific energy options;
- GHG reduction target setting
- Consultation process
- CEP development based upon the results of the pre-feasibility studies and consultation; and
- CEP implementation, including
    - Feasibility and engineering studies for approved measures; and
    - Integration of CEP into municipal processes and the City of Quesnel OCP

According to Wally Semenoff, Manager of Planning for the City of Quesnel, initiatives that are likely to proceed include:

- An application to the Ministry of Energy and Mines for funding for implementation (energy co-ordinator, feasibility analysis) under the communities initiative.
- An application to GMEF to examine the feasibility for extract heat from pulp mill settling ponds, to heat swimming pools and a local college
- Continuance of the Woodstoves exchange program – can trade in stoves and get $3-400 savings (MWLAP).
- Consultants are currently looking at the viability of a wood waste co-generation plant.
- Ground source heat pumps – municipal facilities
- The use of solar hot water in municipal facilities.
- A private silvaculture nursery is already using waste heat forma local industrial operation to heat greenhouses (co-location).

- The CEOR recommended that the City complete a Corporate Inventory of GHGs (Milestone 1 PCP). Since completion of the report, Quesnel has done a municipal building energy and emissions inventory.
- Initiation of a study into public transportation possibilities
- Quesnel is embarking on an update of the OCP. The City will be looking towards including energy-related policies and strategies in this update including:
  - Transportation-related initiatives in the OCP:
  - Land use planning policies that create the conditions for an energy-efficient urban transportation infrastructure, in addition to fulfilling other objectives;
  - Reduced embodied-energy roads and road systems (use less energy in their construction)
  - Bicycle trails and pathways

Challenges

The current state of resource economies means that there is limited access to dollars and a reluctance to invest in long-term improvements. This means that GHG is on the radar but job security is number one. However, air quality is a more tangible and immediate concern to most of the community.

Land instability led to moratorium on development on Westside. Skewed market towards area to the south where amenities are not in close proximity which means that people have to drive longer distances.

5. Integration with other Air Quality Initiatives

While the CEOR recognizes the clear links between energy, GHGs and air quality, community energy planning and air quality planning in Quesnel have been largely separate exercises. Air quality issues are a higher priority in this community. However, energy and GHG reduction strategies that align with local air quality objectives are likely to be supported. Pembina Institute used much of the air-quality inventory work to develop a baseline for the community energy planning process. While air quality planners were aware of the CEP process, (through Councillor Mike Doyle who sat on roundtable), the value of the CEP was immediately recognized as it was seen as focusing more on the commercial, residential sector which in Quesnel is less important than industrial emissions for air quality.

Because most of the industry is already using wood, there is reduced potential for improvement in GHG emissions. However, the industrial facilities also consume vast amounts of electricity and natural gas). A potential conflict is that the Federal Government is pushing reduction in the use of natural gas and promoting use of wood, but burning wood causes poorer air quality (wood waste diverted from beehive burners mitigates this).

The completion of the PCP milestones can be efficiently achieved through a community energy planning process. Some of the milestones have been addressed in the Community Energy Options Report (CEOR) including a summary of the Energy and Emissions Baseline Report (Milestone 1); Energy and Emissions Management Options including possible emission reduction targets and land use and technology options (Milestone 2); and a series of recommendations for how to proceed with the development of a Community Energy Plan, which would fulfill the objectives of a "Local Action Plan" (Milestone 3).

However, in a community that has multiple challenges, taking an integrated approach leads to more robust solutions. For example a combined heat and power facility not only reduces solid waste, but also improves a company's financial bottom line, and with proper emission controls can also improve air quality. The CEOR report even highlighted an opportunity for a biomass-fired CHP plant to provide heat for a downtown district heating system (similar to proposals in Revelstoke and Prince George). If subsequent studies indicate that this option is financially sound, this measure could result in improved air quality (by displacing remaining beehive burner use with high-quality emissions controls on a new CHP plant), reduced GHG emissions (displacing natural gas usage for space heating), diversified economic activities (local wood products industry selling heat and power) and a stimulus to a revitalized downtown (through reduced heating costs for downtown businesses, and possible winter heating amenities for pedestrian shoppers). A project of this nature can only be conceived of when AQ, GHG and community development goals are considered together so that possible synergies can be identified.

Pembina's baseline methodology examines energy consumption, energy costs, GHGs and CACs. The author of the CEOR report was particularly attuned to the issue of harmonized reductions.

6. Lesson's Learned

Air Quality Planning

The consensus-based air quality planning process was very successful due in part to the work of local environmental group spearheading the project. WLAP not leading the process but offering technical advice.

The City of Quesnel provides room and lunch for Roundtable meetings and this ensures a really good turnout.
Meetings are chaired by QES. QES acts like a board of directors for the process and gives approval for spending. This has been a very successful arrangement.
The committee structure is a true roundtable where everyone is equal. Decision-makers connected directly to technical people in MWLAP

There is a concern that focusing on GHGs and energy related issues may jeopardize the air-quality planning success.

Community Energy Planning
A municipal champion is critical. Quesnel has a very strong sustainability champion in councillor Mike Doyle. He has being a strong supporter of the CEP, OCP and is now championing a biofuels initiative.

Quesnel has many local people and groups who care deeply about the community and are committed to environmental improvements. These include an Airshed Roundtable, an local environment committee, the Community Economic Development Association. The environmental community and local industry work co-operatively and have built lasting partnerships. In addition, many of the *large industrial employers are engaged in the community projects and are thinking beyond there own corporate concerns to the wider community.*

7. Senior Government Roles and Issues

MWLAP was a key partner and provided technical assistance to the air quality planning process. This is critical for small communities that do not have the resources to hire technical staff or monitoring equipment.

Funding support for implementation is required, especially to conduct feasibility analyses for new energy infrastructure.

MWLAP is currently has mandated reasonability for and is therefore focused on CACs with a secondary interest in GHGs. However, there is the opportunity fro MWLAP to broaden its scope and pay attention to the larger energy picture. Provincial ministries need a more balanced view of air quality, energy, GHGs and the potential tradeoffs and synergies that exist. Going beyond traditional end of pipe air–quality solutions to explore zero-emissions energy generation and demand side management would be beneficial.

BC Hydro's PowerSmart program is highly beneficial to community energy planning initiatives. CEP would benefit from similar DSM initiatives by other utilities (e.g. Terasen).

It is important that implementation money not be confined to research. Funding for infrastructure is needed as well). Otherwise, there is the danger that studies will never get implemented. Studies should not become ends in themselves and there is a need to balance analysis with concrete steps that can demonstrate to the community that the approach has tangible benefits.

8. Contact Information/Interviewees

Nicholas Heap, Pembina Institute for Appropriate Development.
Wally Seminoff, Director of Planning, City of Quesnel
Norm Zirnhelt, MWLAP, Cariboo Region – Tel. 1 250 398 4545

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B.9 Case Study: Resort Municipality of Whistler and the Sea to Sky Corridor

1. Background

Summary: Integrated Energy, Air-Quality and Greenhouse Gas Management Plan (Whistler)
AQMP with consideration of GHG and energy co-benefits (Sea to Sky)

Whistler is an extremely successful recreational resort, the third busiest ski resort on the planet. The Resort Municipality of Whistler (RMOW) is acutely aware that this success is founded on the exceptional outdoor recreational facilities coupled with the Canadian image of a clean, natural environment. Therefore, one of the key resort business strategies is to preserve that image through protection of the natural environment. Consequently, Whistler has adopted a number of progressive initiatives in recent years to manage the environmental impacts of population and tourism growth. This has included adoption of The Natural Step in 2000 as an umbrella framework for more detailed work, the completion of the Whistler Environmental Strategy (WES) and the initiation of a Comprehensive Sustainability Plan in 2001 which is on-going. An Integrated Energy Plan (IEP) was recently completed that is the first initiative in Canada to include energy, air quality, and GHG management planning in one document.

RMOW joined the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection Program in 1997, committing to reduce GHG corporate emissions by 20% and community emission by 6% from 1990 levels from the community. The Whistler Environmental Strategy (WES) called for Development of a Community Energy Plan (CEP) and outlined a number of broad goals and actions for reducing reliance on fossil fuels. A CEP was initiated in 2001 in order to identify opportunities to reduce GHG emissions associated with energy consumption. Following completion of the first draft of the CEP in 2002, WLAP approached the RMOW and suggested that an air quality component could also be incorporated into the plan. Therefore, an **Integrated Energy Plan (IEP)** was initiated in 2003.

In 2002, MWLAP staff approached the Whistler engineering department and gave a presentation on air quality in the Sea to Sky Corridor. The data indicated that air quality was already deteriorating, warning of future air quality problems similar to those seen in the lower mainland and other communities. This was the impetus to blend air quality planning into the CEP, a first draft of which had already been completed. RMOW felt that the most effective strategy to involve other municipalities in the process, and extend the management plan throughout the Sea-to-Sky corridor would be to lead by example, and allow other communities to learn from the Whistler experience before investing their limited resources into such a project.

MWLAP with communities in the corridor is currently developing an AQMP for the entire Sea to Sky corridor that stretches from Bowen Island to Pemberton in and includes Whistler and Squamish. Currently in the first of two phases, MWLAP has retained a consultant to review existing initiatives and evaluate opportunities for a community-based AQMP process. Phase 2 will be the development of the actual AQMP that will build on these existing initiatives by engaging regional and local stakeholders.

Whistler Integrated Energy Plan A)*Component of a broader initiative, B)Comprehensive*
The Integrated Energy Plan (IEP) uses an Adaptive Management Framework (Vision, Directions, Goals, Indicators & Targets, Strategies & Actions) to ensure that the plan can be embedded within Whistler's Comprehensive Sustainability Plan (CSP) – "Whistler, It's Our Future"

Spatial Extent
The Energy and Emissions Inventory only included the energy/emissions within the RMOW borders. However, estimates of the impacts of "inter-community transportation" resulting from the large tourism industry were also calculated for comparison purposes and possible inclusion in future plans.

Temporal Aspect
The IEP took about 2 years to develop. The writing of the Comprehensive Sustainability Plan and the revising of the Official Community Plan will be completed by the end of October 2004. A monitoring program will be developed in conjunction with the development of the CSP.

Linkages with existing efforts
The IEP is related (although not strongly) to the CSP which has a predominantly land use, and affordable housing focus. The Whistler Environmental Strategy (WES) called for the development of a CEP and the development and implementation of an Air Quality Management Plan. The IEP adopted a common language, using the structure of vision, goals, and

indicators in the Whistler Environmental Strategy (WES).

- Strategic goals are closely tied to those in the WES, and the Comprehensive Transportation Strategy (CTS).

Champions
Whistler benefits from strong support for all the above-mentioned initiatives from municipal politicians.

Senior Government Legislation

- BC Waste Management Act – WLAP is responsible for managing air quality (issuing permits; monitoring point sources; monitoring and controlling air pollution) in all regions of the province except the GVRD.
- Provincial Ambient Air Quality Objectives
- Federal Air Quality Goals

Sea to Sky AQMP A)*Standalone Plan B)Comprehensive*
Although it will be a standalone document, the Sea to Sky AQMP will build on many existing air-issues related initiatives in the communities of Whistler, Squamish and elsewhere in the corridor.

Triggers
The need for an AQMP was triggered by a number of factor including:

- A MWLAP review of ambient air-quality data indicated a number of exceedances associated mainly with ozone and particulate matter.
- The granting of the Olympics and projected growth in the corridor has amplified concerns about air-quality and regional sustainability.
- The upgrading of the Sea to Sky highway has triggered concerns about mobile sources of emissions.

This combination of these factors has encouraged communities in the corridor to sit down and discuss air-quality related issues in a way that hasn't been done before

Spatial Extent
The Sea to Sky corridor extends from West Vancouver to Pemberton and includes the communities of Horseshoe Bay, Gibsons (on the Sunshine Coast), parts of West Vancouver and Bowen Island (GVRD), Lion's Bay, Britannia Beach, Squamish, Whistler and Pemberton.

Temporal Aspect
Although, MWLAP has been monitoring ambient air quality in the corridor since the 1980's, the AQMP process did not begin in earnest until 2003. Development of the plan is expected to take at least two years.

Champion
RMOW has been involved from early on and has, along with MWLAP, championed this regional process. The MWLAP hired Sheltair Resource Consultants to develop the phase I study and report which is currently in draft form.

2. Planning, Organisation and Funding

Whistler IEP
Funding for IEP
Financial support was provided by Natural Resources Canada , BC Hydro, MWLAP and the balance from municipal coffers.

Budget for the Comprehensive Sustainability Plan
The total expenditure to date is $1.27 million. The proposed 2004 budget for the CSP and the rewrite of the Official Community Plan is $207,000. Expenditures from January 1, 2002 through December 31, 2003 were $936,784. This includes all fees for the proposal call, consultants, studies, website and other communication and advertising materials, office operations, and public participation sessions (events). The total expenditure for project management, which was contracted out, from February 2002 through December 2003 was $333,393.27. Internal costs (staff time, photocopying, etc.) was not calculated in this project.

Who is involved in the CSP?

- Mike Vance, municipal general manager of community initiatives, is the overall project manager. Other municipal staff involvement includes engineering, planning, finance and communications staff from time to time as needed. Council is updated regularly and provides overall direction to the process and to the development of the blended future, preferred future and strategies.
- Envision Sustainability Tools, which built the computerized Quest model, is reconfiguring it to provide a user interface, which will enable the municipality to use it over the years to monitor the resort community's progress in moving towards a sustainable future.
- Shannon Gordon, the municipality's sustainability coordinator, and Esther Speck, a specialist in The Natural Step and sustainability, are working closely with staff to integrate the Natural Step Framework in the development of the strategies.
- The Citizen's Advisory Committee, formed in April 2003, continue to provide valuable input to both the process and the development of the blended future and strategies. Staff have met with the advisory committee several times since November 2003.
- Work sessions will be conducted by staff with various members of the community recruited through the Chamber of Commerce and other means.

Who is involved in the Integrated Energy Plan?

Brian Barnett (Engineering Services) took the lead role and was the key member of staff for this project. Dave Waldren (Whistler's TNS consultant at the time was also involved as an advisor). The Sheltair Group was the consultant hired to develop the plan. Other RMOW staff were asked to incorporate air-quality and energy considerations into their work including transportation and waste management.

Public Consultation

Whistler didn't launch a separate public consultation process around the IEP as there were already many other concurrent planning processes competing for the public's attention. Rather, public consultation for the IEP was rolled it into other related initiatives such as transportation planning and the CSP.

Sea to Sky AQMP

Funding for the initial studies and phase 1 report has mainly come from MWLAP. However, it is hoped that funding for the development of the AQMP (which is likely to cost between $50 and $100, 000) will be shared by the ministry and communities in the corridor. However, it is acknowledged that some communities in the corridor have few resources for such work. MWLAP and Whistler have shared the costs for several air-quality related initiatives in the past.

Who will be Involved in the Sea to Sky AQMP?

The Sea to Sky AQMP will be a partnership initiative. A steering committee will be established with MWLAP playing a technical support role to this committee. Key stakeholders involved include MWLAP, local municipalities, Squamish-Lilloet Regional District, Tourism Whistler, Whistler Blackcomb, and the local chambers of commerce. GVRD will also be asked to be involved as GVRD emissions have a significant impact on air quality in the corridor. A consultant will be retained to develop the plan.

3. Data Gathered (inventory and baseline)

Whistler IEP

Baseline: 2000 is the baseline year for IEP. Energy and emissions data were calculated for 2000, and estimates made for 1990 for the purposes of estimating compliance with PCP targets.

IEP - Energy and Emissions Inventory

An energy and emissions inventory for the year 2000 was prepared using fuel consumption estimates for buildings, infrastructure, and transportation. The inventory only included the energy/emissions within the RMOW borders. However the impacts of "inter-community transportation" resulting from the large tourism industry on energy and emissions were also estimated and documented. The inventory was calculated using the following data sources:

- Energy sources in Whistler: electricity consumption provided by BC Hydro, propane consumption supplied by Terasen, wood for space heating, and diesel and gasoline for vehicles;
- Data for residents, businesses, and visitors, as well as for municipal operations
- Discussions with representatives of BC Hydro; Terasen; Whistler Housing Authority Staff;
- For transportation energy, the methodology adopted by the Partners for Climate Protection Program was used which includes *intra-community* transportation but not *inter-*

community transportation. Data was derived using Whistler's existing EMME/2 Travel Demand Forecasting Model to existing and predicted travel demand. This was supplemented using fuel sales from Whistler service stations.

GHG and Common Air Contaminant (CAC) emissions resulting from energy use were then estimated using standard emission factors from the US EPA (www.epa.gov/ttn/chief/) for the various fuel types used in Whistler. Results were supplemented with ambient air quality monitoring data collected by WLAP.

- CAC emissions were presented in 3 categories: point source (i.e. large industrial sources that are provincially regulated), area source (i.e. those emitted from a number of dispersed individual small activities), and mobile source emissions (i.e. light and heavy duty vehicles). Results were compared to the 1995 Sea-to-Sky Emissions Inventory (MWLAP)
- Ambient Air Quality: MWLAP continuously monitors ozone and nitrogen oxides in Whistler Village, and will begin monitoring fine particulate matter and inhalable particulate matter in spring 2004. Environment Canada monitors air quality at a high altitude station
- GHG emissions from fuel sources were supplemented with those from solid waste disposal.

IEP - Energy and Emissions Forecast: 2000 to 2020

- Energy and emissions were forecast to 2020 to provide information for energy management planning
- Forecasts were developed using projected estimates for population, infrastructure, and efficiency
- Two development scenarios were developed: Business As Usual & Recommended (including energy efficiency, demand reduction and fuel switching initiatives).

Data Challenges

The seasonal nature of the tourism/skiing industry posed some challenges for creating a reliable inventory. Whistler has 10,000 permanent residents but also accommodation for 45,000 tourists. The transient nature of the tourist population was a real challenge for estimating per capita energy use and GHG emission as occupancy rates vary from year to year and season to season. Whistler decided not to incorporate Tourist traffic into the study as there is great difficulty in looking at the journey start. They wanted to focus where the municipality could have some control - taking a walk before you run approach. There is also difficulty in estimating future growth (the CSP is looking at this and the OCP has a 55,000 bed unit cap.) The fluctuating hotel occupancy rate also presents a challenge.

Calculating a baseline for 1990 (for PCP purposed) proved challenging as the municipality didn't have an inventory for fuel for 1990. Therefore, the consultants had to rely on fuel averages and back casting.

Finally, some Whistler residents purchase fuel in neighbouring Squamish and Pemberton where prices are somewhat cheaper and this can skew fuel consumption estimates that are based on fuel sales within the municipality.

Sea to Sky AQMP

MWLAP has been monitoring ambient air quality in the Sea to Sky corridor since the 1980s. A 1995 air emissions inventory (Pitre, 2002) was completed based on the 1995 Provincial Emissions Inventory. In addition, Environment Canada and University of British Columbia have studied the air-quality problem associated with ozone and are evaluating the what percentage of measured concentrations are from local versus long-range sources. There are also concerns about particulate matter. Currently, non-continuous PM2.5 monitoring is performed in Squamish and a continuous monitoring station for PM2.5 is planned for Whistler.

Data Challenges

The 1995 Provincial emissions inventory (which is based in standardized formulae) is not adequate to characterize the emissions of the corridor. Emissions in the corridor are atypical for several reasons including:

- Large contribution of mobile sources on Sea to Sky Highway
- Large tourism related emissions
- Large contribution of emissions from sources outside the corridor GVRD
- Difficult to correlate primary pollutant emissions with photochemical secondary pollutant concentrations.

The inventory also does not include GHG emissions or energy consumption as the Provincial Inventory is not based on energy consumption data but rather uses standard emissions estimates for different sources.

Numerous studies completed as part of the Sea to Sky expansion have began to address some of the data gaps. However, more accurate data will be required to complete the AQMP.

This might include:

- An estimate of emissions coming form the GVRD (will require comparison of ambient air quality data with local inventory);
- Modelling of air flows from GVRD to Sea to Sky corridor, and
- A sophisticated air-quality model that can address photochemical pollution. This could be based on Environment Canada's Georgia Basin model.

4. Implementation and Results Achieved

Whistler IEP

Recommendations for implementation of the plan and work already underway (in square brackets) include:

1. Switch Fuel from Piped Propane to Natural Gas – working with Terasen (utility owns propane gas system in Whistler) to develop alternative fuel supply options.
2. Implement expanded Whistler Comprehensive Transportation Strategy [a transit strategy is under development].
3. Divert Solid Waste (50% by 2010; 70% by 2020). [The municipality is working with the Squamish Lilloet Regional District to develop a solid waste management plan that recognizes opportunities for energy efficiency, and reduction in GHG emissions.]
4. Increase Municipal Fleet Efficiencies [Whistler has commissioned a study examining alternative fleet fuels, would work in partnership with Whistler/ Blackcomb and BC Transit]. New fuel could be Natural Gas. New diesel standards will also result in a large air quality improvement. [Whistler is working on fuel cell research, to showcase during the 2010 Olympic Games.]
5. Support Public Education and Outreach through the "Whistler, It's Our Nature" Comprehensive Sustainability Plan
6. Switch Fuel from Large Hydroelectric to Small scale Local Renewable Energy – largely outside municipal control. 100 applications for Independent Power Producer (IPP) projects in Sea to Sky Corridor. [The municipality is also looking at the viability of Earth Energy (Geo-exchange) systems for municipal and private sector buildings.
7. Improve Energy Efficiency for Buildings {Recently commissioned a study to develop a LEED residential standard for the Municipality. The municipality is using the LEED rating system for a new wastewater treatment plant design].

In addition, staff have been asked to include airshed issues in presentations on regional projects such as Sea to Sky Highway and for air quality to be integrated into other initiatives such as the Transit Plan (draft).

As part of the IEP, A **Sustainable Energy Vision** for Whistler was also developed to identify long term energy opportunities to apply The Natural Step principles to energy management. The Sustainable Energy Vision for Whistler provides longer-term opportunities to help achieve RMOW's targets for energy, air quality and GHG management, based on the Natural Step. Provides 4 action areas:

- Energy supply systems – RMOW should consider establishing its own energy utility and a community energy policy. Large distribution grids and remote generation facilities should be replaced with a network of distributed or "on-site" infrastructure systems with shared elements, finely integrated into the fabric of the built environment.
- Land Use Planning – attention should be paid to identifying opportunities for clustering buildings and taking advantage of on-site renewables.
- Transportation – in order to be truly sustainable the resort should consider the energy consumed in bringing people into the community
- Offsets – by implementing measure that will 'offset' the impacts of this travel, Whistler will be taking an important leadership role.

Implementation Strategy for the IEP

A proposed implementation strategy has been developed for the IEP and it includes recommendations for stakeholder engagement, resources, and monitoring and reporting. These are summarized below:

1. Engaging Stakeholders: (Mayor and councillors, Municipal staff, residents, businesses) including Education Phase (now until Fall 2004), Consultation (Fall 2004), and Presentation of Revised IEP (Early 2005), and ongoing communication
2. Resource Requirements: Implementing the IEP will require a core team of planning and engineering staff; outreach and communications coordinator; and a technical expert. Participation from RMOW staff is also necessary. Funding/contracts administration, and administrative and management support, will be provided as part of the overall measures currently being developed through the Whistler's Comprehensive Sustainability Plan. Public works department is responsible for designing the overall plan, providing ongoing management, monitoring and collecting data, as well as tracking outcome and coordinating public awareness activities. Primary work activity includes coordinating and communicating IEP activities, as well as organizing detailed design and implementation of specific activities.

3. Risk Management

4. Monitoring: Framework Monitoring and verifying reductions in energy consumption and GHG emissions can be accomplished to a large extent by accessing currently available information (fuel sales, GHG emissions from landfills, corporate transportation energy consumption; ongoing traffic monitoring data

5. Reporting: Annual progress reports should be prepared to monitor IEP implementation. In addition, more detailed 5 year progress reports should be prepared. Annual reports will describe implementation progress and establish goals for the upcoming year. Annual energy expenditures, energy consumption, and GHG reductions from municipal operations will be reported annually.

6. Implementation Timeline: Commences after consultation and revision, and formal adoption by council 2004/2005.

7. Implementation Strategy: (including staff work plans, roles, responsibilities and budget for the next five years) By Year 3 the Recommended Scenario will be in full operation.

Results

Although it is too early to gauge results, the plan presents a Business-As-Usual Scenario (BAU) in which total energy consumption will increase from 2.9 million GJ to 3.7 million GJ in 20 years. This was compared to the Recommended Scenario which includes an overall reduction of 10.1 million GJ of energy compared to BAU scenario; a 9% reduction in GHG emissions from 2000 levels. Relative to the 1990 baseline established as RMOW's commitment to the PCP, the Recommended Scenario still represents a 22% increase (compared to the 6% decrease to which the RMOW is committed). The IEP notes that given the growth of Whistler since 1990, achieving the PCP commitment will be very challenging.

Sea to Sky AQMP

The Sea to Sky AQMP is still under development so it is too early to say what the implementation or results will be.

5. Integration with other Air Quality Initiatives

Whistler IEP

The Whistler document is a highly integrated plan, combining community energy planning with air quality and GHG objectives.

Technically, it was not difficult to do the integration work. Most of the answers presented themselves fairly easily and the solutions were fairly straightforward because air quality emissions are so strongly linked with energy consumption in Whistler. Social acceptance of the ideas and actions required to make progress presents the biggest challenge.

The energy data shows GHGs are clearly linked with transportation – however, all actions don't necessarily produce improvement in both energy and GHG emissions. Moving from propane to natural gas for space heating, for example, has no impact on energy use but does reduce GHG and CAC emissions.

Sea to Sky AQMP

While the Sea to Sky process will largely focus on, and is predominantly driven by air quality issues, the intent is to address GHG and energy considerations as well. Energy consumption and GHG emissions will be estimated as part of the detailed inventory work.

6. Lessons Learned

Whistler

Integrating energy, air quality and greenhouse gas planning in Whistler is more straightforward that in most municipalities because almost all emissions are fuel based. Unlike many other communities that have significant agricultural and industrial emissions, Whistler emissions are predominantly from the commercial, residential and transportation sectors. Therefore, creating a reliable integrated energy and emissions inventory was relatively simple. GHGs and CACs could be reliably estimated using standard conversion factors.

The Whistler plan is significant in that it is part of a broader sustainability initiative (CSP) which is using the Natural Step as a organizing framework. This seems to have worked well for the community and has created a relatively straightforward set of principles that the community has been able to rally around.

The major challenge for Whistler has been how to account for and influence energy use and emissions from the dominant tourism sector including energy used and emissions derived from transportation outside the municipal boundaries.

The community has already began the process of implementation and recommendations from the Integrated Energy Plan will be implemented through other municipal planning initiatives such as the transportation strategy, waste management planning and the CSP will which led to an update in the OCP.

Sea to Sky AQMP
Funding and staff resources are a big challenge for many of the smaller corridor communities.

Reliably estimating energy consumption and GHG emissions should be relatively straightforward as it was in Whistler. However, the link between energy consumption and CACs will be more complex as there are a number of complicating factors for the corridor which were not factors for Whistler. These include: GVRD emissions and industrial sources of emissions.

Lessons from the Whistler study suggest that integration is best demonstrated by developing a number of scenarios out of which flow air quality, GHG and energy related consequences. Earlier drafts that presented the information related to air-quality, energy and GHGs as separate sections proved not to be as useful. Using scenarios and listing the air quality, GHG and energy implications of each scenario encourages the consideration of co-benefits and allows decision-makers to consider possible conflicts and tradeoffs.

It would be helpful for the proper consideration of sustainability objectives if all air-quality related studies (i.e. transportation, waste management, buildings etc.) were to report on the GHG, air-quality and energy cost implications of options.

7. Senior Government Role and Issues

Senior governments could offer support by further recognizing communities that have done work in this area – the FCM sustainability awards are an example. Whistler would benefit from more recognition because it would give the community credibility when working with other partners such as Whistler Blackcomb, tourism etc. The FCM conference is of immense value to Whistler as it is really one of the few conferences that is government focused while many others involve companies marketing themselves.

Senior governments could also assist in developing social marketing strategies for energy related initiatives.

The Federal government provides important resources and technical advice to the AQMP process mainly through Environment Canada. However, GHGs, energy and air quality are managed in different ways at the Federal Level as well as the Provincial Level. GHGs and energy are primarily the responsibility of NRCan whereas air quality is the responsibility of Environment Canada. Harmonizing the management of CACs and GHGs (aligning policy and programs) at both the Provincial and Federal Level would assist in the integration of air quality related objectives at a local level. At the Federal level this might be assisted if Environment Canada's Air-quality planning group began to consider GHG emissions in their work.

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APPENDIX C: CASE STUDIES OUTSIDE BC

C.1 Case Study: Portland, Oregon.

1. Background

Summary: CEP, GHG Action Plan, Air Quality Management

Portland is considered to have one of the most advanced environmental management systems in North America. It is one of the only municipalities (if not the only municipality) to have successfully reduced per capita GHG emissions in the past ten years. Most of the City's actions are directed by the Office of Sustainable Development (OSD), a group with about 30 staff who direct activities involving waste management, energy, climate change and other environmental portfolios. Responsibility for air quality is at the State level and is therefore not handled directly by the City. The management structure of the city of Portland provides a considerable advantage to environmental actions: of the 5 city commissioners (who ultimately vote on the City's directions), one carries OSD in their portfolio and the other carries climate change. Therefore, any energy/climate change initiatives automatically have at least 2 of 5 votes at the City's highest decision-making level. The City's actions in energy and GHG are as follows:

Community Energy Plan (1990 Energy Policy) *A) Component; B) Comprehensive*

- Portland first adopted an energy policy in 1979 in the wake of the OPEC oil embargo and shortages. At that time, it was the first local energy policy in the US and included the establishment of an Energy Office and citizens' Energy Commission. In the late 1980's, the City took a fresh look at energy issues and developed a new plan based on principles of sustainability – in 1990 they developed a revised Energy Policy. This plan served as a blueprint for actions related to reducing greenhouse gases. The city reviewed this policy in 2000 and decided to fold its actions under the City climate change plan, reasoning that CC gave them a broader "umbrella" than energy (for example, it could include issues such as waste management) and also has social relevance that energy does not have.

GHG Action Plan: *A) Component of a Broader Initiative; B) Comprehensive*

- In 1993 Portland joined ICLEI's original pilot group for Cities for Climate Protection (on which PCP is based) and developed a Carbon Dioxide Reduction Strategy. In 2001 Portland City Council and the Multnomah County Board of Commissioners adopted a joint Local Action Plan on Global Warming, this updated (and superseded) the earlier version.

Air Quality Management: *A) Component; B) Single Issue*

- Air quality issues are handled by the State of Oregon, and therefore the City does not explicitly deal with clean air issues. However, the Energy Office tracks Oregon Department of Environmental Quality reports on air quality in the Portland area, and integrates this into the City's annual "Progress Board" reports.

2. Planning, Organisation and Funding

Community Energy Plan (1990 Energy Policy)

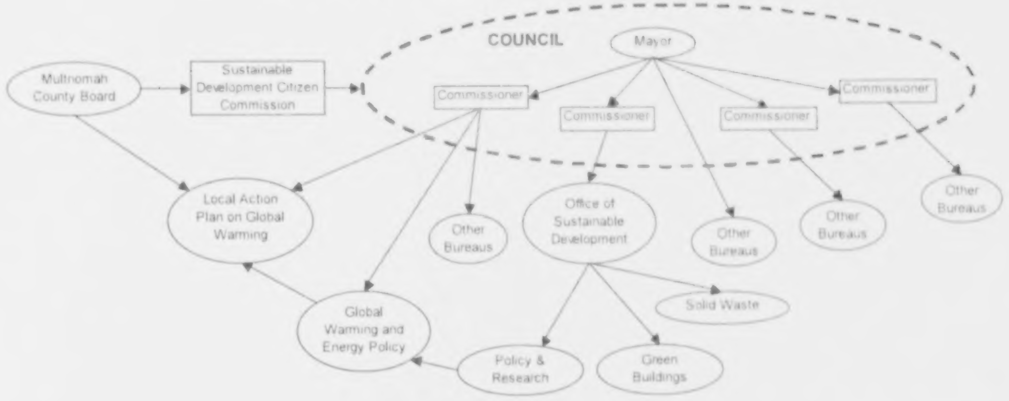
The CEP involved these four elements:

1. **Stakeholder involvement** - 50 public and private groups and associations were involved in the development of the Policy.
2. **Objectives** – The CEP included 89 objectives, ranging from very broad (such as supporting new energy codes for residential and commercial construction or promoting light rail) to the specific (such as increasing energy efficiency by 10% in residential, commercial, industrial, and transportation sectors). A goal was established to cut City government energy bills by $1 million within ten years. See *GHG Action Plan below for specific GHG reduction targets.*
3. **Policy approval** - The policy was approved by the Energy Commission, Planning Commission and City Council and became a formal element of the City's Official plan.
4. **Implementation**: In 2000, the Energy Policy was reviewed and the City decided to integrate it into the City's GHG Reduction Strategy. Overall responsibility for implementing this policy rests with OSD.

GHG Action Plan (GHG Reduction Strategy)

- **Commitment**: GHG reduction strategy was formalized in 1993 after they joined ICLEI's Cities for Climate Protection (CCP) initiative.
- **Setting goals:** Portland set a target of reducing GHG emissions by 20% below 1990 levels by 2010. The State of Oregon has also adopted a goal of a 20% reduction in GHG emissions by 2005.
- **Implementation** – In 2000, the City conducted a 10-year review of its 1990 Energy Policy, and decided to integrate it into the City's GHG reduction strategy. The city felt that climate change afforded them a broader "umbrella" for actions and that it had more "social relevance" than energy on its own. The result was a **Local Action Plan for Global Warming.** Joint responsibility for implementation is held between the Energy Division of OSD and the Sustainable Technologies and Practices Division (STP). STP is responsible for advancing the development of new technologies, community partnerships, market transformation strategies, education programs and project evaluation. They also provide staffing to the Sustainable Development Commission, a citizen commission advising the Portland City Council and Multnomah County Board on sustainable development issues. The Energy Division of the OSD is responsible for implementation of the outreach activities to the business and residential sectors, as well as the Energy Challenge run internally.
- **Monitoring and Evaluation** – There is a "Progress Board" with over 100 indicators, one of which is GHG reductions and another is air quality. Information from these indicators is rolled up into a Progress Report, which evaluates progress and provides directions for future actions. City bureaus develop policies and programs that affect energy use, so many programs are developed with assistance from OSD and then integrated into the budgets and work plans of the appropriate City bureaus. The City considers both public and private benefits in the development of programs.
- Although programs are focussed on reducing GHG emissions, the City "sells" them under different banners (e.g. quality of life, city greening, reduced traffic congestion, energy savings etc.) that are more likely to gain public support. Land use is a cornerstone; the City encourages land use development with a focus on energy efficiency (in relation to transportation).

Structure for Portland's Sustainable Development Actions



Funding:

The Office of Sustainable Development has an innovative funding structure. Half of the OSD staff work on waste reduction and management issues, an area in which the group has a regulatory role. In this way, they act in a utility model with revenues from tipping and franchise fees. The other half operates almost as an "entrepreneurial" freelance group, partnering on various projects with organisations who have a similar mandate (for that particular project, that is). Although this group receives some general tax revenues, most of their funds come through their partnerships. With popular support for their work, and significant sway at the commissioner level, long-term stable funding is assured. Of note:

- From 1990-2000 the Energy Office (the precursor to the Office of Sustainable Development) received $1.88 million from the general tax fund, and leveraged more than $4.68 million in grants, utility contracts and interagency agreements. This represents $2.49 for every dollar of general fund invested.
- Some savings accrue through the energy bill, i.e., street lighting improvements realized savings of ($1 million annually).
- The City secured funding to finance energy-efficiency projects at City facilities: the City provided $1 million from a bond measure for 1991 to 1994.

3. Data Gathered (inventory and baseline)

Community Energy Plan (1990 Energy Policy)
Portland has good access to utility data to inform them of local energy uses, and they can then estimate GHG emissions and track changes (in US, private utilities require a franchise from the local government and are required to report annually). In 1990, a City Facilities Energy Use Report was generated and is now updated annually. OSD staff collects data from 830 electric and natural gas meters as well as deliveries of transportation fuels for all City bureaus and facilities. This information is organized and reported as million BTUs consumed and dollars spent. OSD has also tracked energy use by sector both in the City of Portland and in the regional area from 1988 through 1999.

GHG Action Plan (GHG Reduction Strategy)

In the strategy, carbon dioxide reductions are targeted within six elements. Each of the elements has objectives with target carbon dioxide emission reductions and specific actions to achieve each objective. The first five elements rely on the actions of local governments, individuals, utilities, and other businesses. While 4.8 MMT of the 5.8 MMT to be achieved is through local efforts, the remaining 1 MMT to be achieved is through actions at the federal level.

Air Quality Management
The Energy Office tracks Oregon Department of Environmental Quality reports on air quality in the Portland area. The Two-Year Action Plan compiles, integrates, and updates basic data on the sources of air emissions, uses and costs of energy within the City and related air quality, solid waste, and environmental data.

For the Progress Board Reports, several existing benchmarks and additional indicators of sustainability were selected by the Sustainable Development Commission. Included are measures of air quality, vehicle miles traveled (VMT), traffic congestion, toxic releases, tree canopy, recycling, carbon dioxide emissions, poverty, home ownership, building codes, and job and housing growth in central cities. To gather data, they relied on comparative studies completed by federal agencies and academic institutions.

4. Implementation and Results Achieved

Responsibility for implementation of the program is jointly held with the Energy Division, and the Sustainable Technologies and Practices Division of OSD.
Results obtained are favourable. Overall, from 1990 to 2001, per capita CO_2 emissions decreased significantly, from 16.9 to 15.6 metric tons, largely due to aggressive electricity-conservation efforts promoted by local utilities, the State of Oregon, and the City of Portland. To implement the Energy Policy in 1990, the City focused first on its internal buildings and facilities with a program called the City Energy Challenge. Council was anxious to capture the significant potential savings and also felt it was important to set an example for residents and businesses. By 2000, more than 90% of the objectives in the plan have been achieved, including:

- City energy bills were reduced by $1.1 million annually for a total reduction of more than $7 million.
- Technical and financial assistance programs and awards offered by the state, city and utilities for businesses and property owners resulting in energy efficiency improvements in more than 40 million square feet of commercial and institutional space. The City partnered with utilities to offer energy-efficiency services to 6,700 households (these included free energy audits).
- Through contracts with Portland General Electric and Pacific Power in 1992 and 1993, the Energy Office provided early design assistance and information on incentives to 137 projects.
- More than 22,000 apartment units weatherized through joint efforts among the City and local utilities.
- There was a 9% reduction in per capita household energy use.
- New commercial and residential state energy codes were developed in association with the State of Oregon.
- There is an increased bicycle and transit modal share.
- Installation of a waste methane fuel cell-the first in the western US.
- New partnerships to build and sell renewable green power resources.
- City Energy Challenge has supported training opportunities for the commercial and institutional sector involving energy, facility, and fleet managers in Portland. The Energy Office has both conducted trainings and publicized others' training events. The Energy Office has encouraged solar energy use and daylighting in a number of one-

on-one with commercial property owners".

- Portland General Electric (utility) has created a subsidiary, Portland Energy Solutions, to establish a district cooling system in downtown Portland. Public-private energy-conservation partnerships since 1990 now save 450,000 MWh annually.

5. Integration with other Air Quality Initiatives

Air quality is handled by the state and there has not been a great deal of explicit integration between the state initiatives, and Portland's sustainable development work. That being said, there is an inherent integration due to the high profile of sustainability issues. Portland implements a variety of initiatives that have a range of benefits (including clean air) all under the roof of sustainability, although each individual action is "sold" on whatever works best in that particular context: clean air, energy, reduced congestion, liveable cities etc.

6. Lessons Learned

The following lessons learned emerged from this case study:

- **Energy provides a good focal point.** It appears that clean air and GHG actions are naturally integrated through energy use, and energy supply and demand therefore provides a good focus for an integrated program. Energy is relatively straightforward to address (as opposed to fugitive emissions or common air contaminants) and evidence indicates that energy-related investments can almost always be justified on a financial basis. Portland's experience indicates that a great deal can be done on energy supply and demand before there is a need to "trade off" with GHG and clean air concerns. In other words, the first 90% (for illustrative purposes) of energy-focussed actions will also reduce GHG and improve air quality. The inverse is not necessarily true: a program to reduce industrial air contaminant emissions will often increase energy use and GHG emissions.
- **Coordination by an autonomous, stable group helps.** The Office of Sustainable Development (with a staff of 30) has developed into a semi-autonomous group with access to both tax-based funds and external funds for "opportunistic" projects. This has enabled OSD to drive a wide variety of long-term initiatives.

7. Senior Government Roles and Issues

The Oregon state government has played a key role in Portland's development, primarily through "enabling" legislation that provided the basis for strong action. Two of these are described here:

- Portland's commitment to addressing climate change is rooted in state policies dating to 1973, when legislation required all Oregon communities to establish comprehensive plans addressing land use, transportation, parks, and energy, among other issues. This requirement for long-term planning is partly credited for creating a "value shift" within the City itself.
- The State has implemented a number of programs that greatly encourage actions on energy and GHG. City representatives indicated that the most significant has been the Business Energy Tax Credit, a program that gives a 35% tax credit on the incremental cost of efficiency improvements. The City has "gotten a lot of mileage" out of this fund, and has found creative ways of using it – at one point the City convinced a commercial bank to pay for LED signalling upgrades for which it received a tax credit. The bank then passed half of the savings on by leasing the bulbs to the City. In addition to this program, Oregon requires employers to implement plans to reduce commuter VMT, and, most recently, began requiring power-plant developers to offset part of the CO2 emissions from plant operations, resulting in more than $7 million in carbon-offset investments.

8. Contact Information

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C.2 Case Study: City of Greater Sudbury

1. Background

Summary: GHG Action Plan, CEP and Air Quality Initiative

The city of Greater Sudbury, Ontario, is a growing community of 165,000 people located 400km north of Toronto. Among mid-sized Canadian municipalities, Sudbury has been particularly pro-active in seeking solutions to environmental improvements in all areas of municipal life. The overall planning structure for the city of Greater Sudbury stems from the Office of Corporate Strategy and Policy Analysis, which supports the Chief Administrative Officer and City Council in the development and implementation of Council's vision, strategic priorities and policies. Notable environmental goals first appeared in the Corporate Strategic Plan in 1994, and in the Strategic Energy Plan in 1997, when the city joined the FCM's Partners for Climate Protection (PCP) program.

Sudbury has an environmental legacy from historic forestry and mining practices in the area in previous decades. The public and political leaders understand the long-term commitment it takes to recover from environmental damage. This legacy has enabled many actions of the municipal team because resources, financial and human, were committed to various initiatives. Strong partnerships with industrial representatives have also developed over the years resulting in multiple benefits for the community and industry.

GHG Action Plan: *A) Component of a Broader Initiative, B) Comprehensive*
- Component of a broader Local Action Plan (LAP) - *EarthCare Sudbury*. This initiative began in 2000, and was a process for implementing the PCP program. It used the following support mechanisms: FCM, the federal Climate Change Action Fund, the International Council for Local Environmental Initiatives (ICLEI). Technical aspects of this initiative include a **Greenhouse Gas Emissions Inventory**.

Community Energy Plan (CEP): *A) Component of a Broader Initiative, B) Comprehensive*
- The CEP includes activities to increase the energy efficiency within the corporation (i.e. municipal buildings); a Community Energy Efficiency Strategy, as well as a Community Energy Supply Strategy
- Drivers for a CEP include reduced municipal and community costs for energy, as well as the economic benefits associated with energy dollars spent locally. Increased local environmental benefits from burning cleaner energy and reducing greenhouse gas emissions are also benefits.

Air Quality Initiative: *A) Component of a Broader Initiative, B) Comprehensive*
- The City is developing an Air Quality Initiative, driven by health concerns related to ground-level ozone carried north from southern Ontario, as well as local environmental concerns related to sulphur dioxide emissions from local mining activities. The goal of the Air Quality Initiative is to encourage air pollutant emission reductions by the community, and for the city to respond appropriately when smog alerts are issued. Industries in Sudbury have reduced air pollutant emissions by about 90% in comparison with two decades ago.

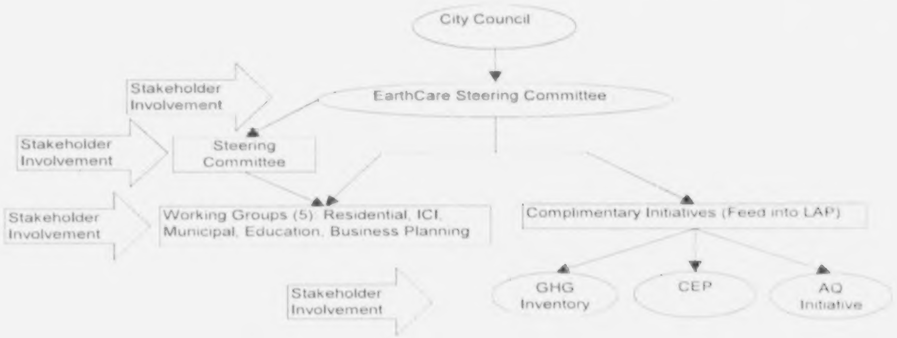
2. Planning, Organisation and Funding

CEP
Sudbury's program began with an energy efficiency study of its municipal buildings. This study was initiated as a result of a partnership with ICLEI in the early 1990's for ICLEI's Ontario Municipal Energy Collaborative (OMEC). As a result of OMEC, Sudbury identified the most significant potential savings in energy were in its water and wastewater facilities rather than its other building stock. Deep energy efficiency measures were approved by Council on the basis of cost avoidance, resulting in $1 Million annual savings in operating costs currently. Council invested the capital funds and maintained its policy of not borrowing funds; a policy change to allow a 7 year payback was instituted for energy efficiency investments. Other measures, such as traffic signalization energy reductions have since been implemented. Funding for the Strategic Energy Plan and feasibility studies was obtained from FCM through the Green Municipal Enabling Fund, the federal Climate Change Action Fund, and the Ontario Sustainable Energy Association is assisting in the Community Energy Supply Strategy.

There are two co-generation energy systems in Sudbury: one in the downtown core and one for the hospital complex. The municipality is a partner in the core area system. A community-wide energy efficiency program is underway as part of EarthCare Sudbury to achieve savings of $5 Million annually in the community. A second long-term goal is to supply 50% of community energy needs from local renewable sources, including wind power, small-scale hydro, landfill utilization, and geothermal sources. Currently $392 Million per year is spent on energy by the community; keeping half of this money in the community as a new revenue stream is the driving impetus for the alternative energy systems planned. The expectation is that the city will invest in this infrastructure locally, businesses will then purchase the local energy, resulting in local revenues that can be reinvested in local economic development. Job creation from new business locating in the city and increased tax revenues are other benefits. ICLEI has provided the city with a business plan on this aspect, which outlines each planned project activity as a sustainable funding source. The detailed Business Plan includes financial modeling and analysis, field data (such as wind source quality), and a control and ownership model for projects. All potential partners on energy source projects will use the same Business Plan for approval purposes.

The partnership for community energy planning now involves multiple agencies, including the city, ICLEI, local utilities and external energy consultants to conduct a detailed energy audit of all municipal buildings. Elements of the CEP are still under development.

The GHG Action Plan and LAP
The GHG Action Plan is part of the broader LAP initiative: for the development of this LAP, partnerships were key at all stages. The following diagram provides an overview of the structure of the LAP and components.



The LAP Planning Process (Milestone Three of the Partners for Climate Protection Process):

1. **Build the Foundation:** community partners signing a declaration committing to develop the LAP and increase participation of the public in local initiatives. The Steering Committee was established, and funding secured from Environment Canada's Climate Change Action Fund, the FCM, the and city of Sudbury. The LAP initiative was driven by senior officials. The mayor and councilors were very involved in all aspects of this initiative, primarily for the local environmental sustainability benefits that could be achieved, as well as the related economic benefits. Development of the LAP involved 5 Working Groups, and over 90 community partnerships involving private companies, unions, academic institutions, provincial ministries, utilities, health institutions, and non-governmental organizations. The initiative is led by a Steering Committee with primary representatives from the City. Success of this initiative is attributed to the overwhelming commitment of senior officials, councillors, and the city's method to use a signed declaration or "social contract" for partners to pledge their support for the initiative.
2. **Set Goals:** Community partners, with input from the broader community, will establish goals, objectives and targets to guide the LAP within the working groups. The larger goals of the LAP were established (community sustainability, protecting the climate, improving quality of life, and strengthening the economy.
3. **Develop LAP Components:** Five Working Groups were established: 1) residential, 2) industrial/ commercial /institutional, 3) municipal, 4) education and outreach, and 5) business plan development. All working groups were to identify and prioritize opportunities in their sector, consider the barriers and benefits, and develop recommendations for inclusion in the LAP. **Milestone One and Two of PCP occurred here –see section 3 below for detail.
4. **Prepare Integrated Plan:** All recommendations from the working groups were integrated by a Steering Committee (of both city staff and community members) into a draft LAP, along with an implementation strategy and business plan.

5. **Confirm the Plan:** The working groups re-convened to review the integrated plan. At this time, input was solicited from the broader community.
6. **Approve the Plan:** A final plan was assembled by the steering committee and approved by city council.

Partnerships are key to the LAP
The LAP was a 3-year process with stakeholder involvement at all stages. In addition to the official community partnerships, and community representation on all working groups, the public was also involved through a series of workshops throughout the development and approval of the LAP. For continued stakeholder involvement, partners will establish an Industrial, Commercial, and Institutional (ICI) network, with the goal to promote energy efficiency in ICI buildings through retrofits and state-of-the-art new buildings.

One unique aspect of the LAP is the written commitment by senior members of virtually all major companies in Sudbury to develop the plan and to work together to implement the plan. Almost 100 organizations have signed these commitment contracts. Because the contracts were signed by senior level corporate officers, time is saved in getting buy-in to work with the City and are created because of the recognized senior level commitment to the LAP implementation

A new planning initiative is underway for alternative fuel. The city plans to develop a biodiesel facility that will use biofuels developed through feedstock, such as canola. The plan is to develop a plant with the initial capacity to produce 3,000,000 litres per year, scalable to 30,000,000 litres per year within five years. At 3,000,000 litres per year, the project is anticipated to create about $13,500,000 in new economic activity for the city, and at 12,000,000 litres per year new economic activity is projected at $43,362,000. The project will engage the agricultural industry in producing the feedstock, and other facilities, such as a crushing facility for feedstock, will also be required. Glycerin, a key by-product that is used in soaps food items will provide additional opportunities. Unique transportation opportunities will also be created through this initiative to ship biodiesel produced in Sudbury to other areas of Ontario.

Partnerships are key for development of the Air Quality Initiative
This initiative is a committee formed of citizens and representatives from the Ontario Ministry of the Environment (MOE), Inco Ltd, Falconbridge Ltd., the Northern Centre for Advanced Technology, and the City of Greater Sudbury. It was influenced by findings of the Ontario Medical Association, as well as MOE's Air Quality Index, and the province's specific orders to Inco and Falconbridge to reduce sulphur dioxide emissions.

For the Air Quality Initiative, the emission reduction actions are expected to be carried out through the Energy, Transportation and Economic sections of the LAP, so the committee itself will work with local industries to monitor and report on local successes. The committee will maintain a database on local air quality, analyze and evaluate air quality data to establish baselines and priorities, and serve as a forum in which citizens can bring concerns about air quality.

Historically, the air quality emission improvements made by industry in the area have been made through energy efficiency improvements. In other words, a pollution prevention approach has been taken to improve energy efficiency in response to governmental requirements to improve air emissions from industrial facilities. Industry has dramatically reduced its air emissions in Sudbury in the past few decades.

New funding Plans
Sudbury plans to establish a revolving fund for community investments in energy efficiency measures. It will be looking to the federal government for assistance in establishing the fund and will support it through savings resulting from energy efficiency in the community. It is expected to be administered by the community in terms of funding distribution.

3. Data Gathered (inventory and baseline)

GHG Emissions Inventory *(Milestone One and Two of the Partners for Climate Protection Process):*

Sudbury's municipal GHG inventory was conducted by ICLEI under contract. ICLEI uses the CCP software to inventory and project emissions reduction scenarios. The City finds the use of a credible third party to conduct the inventory and to report on successes increases the credibility of its program.
Milestone One - Creating a GHG Emissions Inventory and Forecast: Modelling was based on the methodology used in ICLEI's International Cities for Climate Protection Campaign (Partners for Climate Protection methodology).
Milestone Two - Setting an Emissions Reduction Target: The LAP GHG Inventory used the ICLEI's Energy Services to develop reduction targets. To do this, ICLEI used the goals and objectives developed in the Working Groups. The resulting analyses focused on the sectors that have the most direct impact on GHG emissions. This includes:

energy, transportation, solid waste, and the municipal sector. The plan identified that the greatest reductions will be obtained from the energy sector, at 444,300 tonnes per year, achievable through the implementation of wind generation, small-scale hydro, landfill gas utilization, geothermal energy and solar hot water projects. The other sectors only represent 130,000 tonnes of potential reductions and have not yet been factored into the plan. When they are factored into the plan, the net result, if all actions identified in the LAP are implemented, will be that Greater Sudbury can reduce GHG emissions by 574,800 tonnes a year. This translates into a target of more than 30% reduction below 1990 levels within 15 years, which exceeds the 20% target used in the municipal PCP program. The boundaries used in the scope of this assessment included all sectors in the Greater Sudbury region as a whole.

CEP:
The City conducted the strategic energy plan for the community through a partnership with ICLEI; it identified 86 measures for improvements in building energy efficiency, district heating, wastewater treatment and solid waste management. The aggregate payback of the package was estimated at 7 years, with a total capital cost of $4.5 million. Rather than choosing a few of the quick payback measures for implementation, staff opted to go for the entire package, reasoning that a "leap" is far more effective than a series of small steps. This initiative also aims to reduce energy use through increased efficiency, with targeted savings of at least $5 million annually. The seven year payback is longer than normally approved by Council; ICLEI assisted in "selling" Council on accepting the longer payback. The cost of the municipal energy audit was approximately $75,000 for an external consultant. This took place over a six-month period. The Phase II of the plan will examine the remainder of the City's building stock (175 buildings in total) and is expected to cost approximately $210,000.

A community energy audit was extremely time consuming since energy utilities (Hydro One and the local gas companies) were not receptive to providing energy records for the community. Sudbury approached each significant energy user in the community to obtain energy use records.

The community energy analysis also indicated that 27% of community energy costs go towards transportation fuels. This relatively large percentage spurred additional programs, including anti-idling and a focus on alternatives that has recently inspired a commitment by the municipality to invest in a bio-diesel production facility planned in the community. Sudbury is looking for a private sector partner in this venture.

Air Quality Initiative
Sudbury is involved in a major health risks assessment funded by mining companies. Air quality monitors are set up in the area and some are expected to be maintained for long-term monitoring. These are expected to be accessible to the EarthCare network for data, and may eventually be operated by EarthCare partners (such as Inco and Falconbridge). A baseline study of air quality is planned as a first step in the AQ initiative.

4. Implementation and Results Achieved

The LAP initiative is currently in the implementation stage. The LAP initiative has been selected by FCM as a model for communities across Canada. The city has a new dedicated Division of Environmental Innovation and Energy Initiatives, which will continue to implement the LAP.

For the CEP, completed retrofits on municipal buildings (identified through an energy audit) have reduced carbon dioxide emissions by 26 %, and saved 30 % of annual energy costs, or $1 Million annually. The City immediately benefited from the energy savings as the measures had been funded from the City's capital budget (as opposed to using an Energy Service Company that uses energy savings to repay the investment). The plan is now in a second phase, targeting second priority municipal buildings. In addition, the city is hosting a series of workshops for private / institutional owners of local buildings to help them in developing their own energy management plans. As part of the CEP, a district energy system was developed in the urban core. This system was established by the Sudbury District Heating Corporation – a partnership with the city and Toromont Industries, and considered to be a highly successful project. Feasibility studies for four renewable energy projects have been done, including a wind power project that is expected to proceed shortly. In addition, Sudbury is planning to attract significant community investment in a bio-diesel production facility.

For the Air Quality Initiative, an anti-idling campaign, funded by Natural Resources Canada, has contributed to improved air quality as well as energy efficiency improvements and GHG emissions reductions for the community.

Some energy efficiency measures have improved indoor air quality by allowing increased air exchanges in buildings for the same energy use; this does not results in cost savings but does improve health aspects of building occupancy.

5. Integration with other Air Quality Initiatives

Energy use links all initiatives for GHG emissions, CEP and air quality. The driving factor in obtaining commitment to initiatives is the economic case for savings, cost avoidance, and greater economic diversity of the community. Detailed baseline analysis underpins all planning decisions.

The next stage planned for the LAP is to establish an EarthCare Institute as a primary vehicle for implementing the LAP, led by the community partners. The monitoring phase of the LAP will be developed during the first year of implementation. They plan to seek funding for a feasibility study and a business plan for this implementation phase from a number of potential sources: FedNor, the Province of Ontario, EarthCare partners, foundations, professional organizations and private citizens. The long-term financing strategy for the complete implementation, monitoring, and evaluation stages of the LAP is expected to be secured by the city's revenue stream from investment in renewable energy infrastructure.

6. Lessons Learned

Key lessons learned include:

- Engage political staff from the beginning directly in program development to create champions at the decision-making table; the success of Sudbury's initiative is attributed to the overwhelming commitment of senior officials, councillors, and the city's method to use a signed declaration or "social contract" for partners to pledge their support for the initiative.
- Use pilot projects to make identifiable gains and use these to sell additional phases
- Engage multiple stakeholders when community initiatives are being undertaken; written commitments by senior corporate officials opens doors and saves time
- Energy provides an excellent starting point; Sudbury, proponents were able to convince Council to allocate significant up-front capital based primarily on the energy savings, with additional "co-benefits" in terms of local job creation and energy independence.
- Access funding available for feasibility studies (e.g. Municipal Green Funds)
- Air issues planning (GHG and CEP) can be promoted on the basis of economic benefits alone, although with possible requirements to change municipal policy. Work by an external consultant identified a $4.5 million package of investments with a 7 year payback. Council instituted a policy change allowing for this long-term investment, and provided the long-term funding that served as the backbone for subsequent measures.
- Use of an independent party (ie ICLEI) for inventory and reporting provides additional credibility to reporting on the progress
- Invest in solid baseline data collection for inventories
- The environmental legacy of Sudbury has assisted in moving initiatives forward

7. Senior Government Roles/ Issues

The capacity of municipalities, especially of small and medium sizes, is a major barrier to air issues planning. Capacity includes budget and human resources. Senior governments could play a role in establishing capacity, such as a one-time grant to set up a revolving fund for community access to capital for energy efficiency investments. Other funding for capacity development would also be beneficial.

Access to utility data in Ontario is a significant source of time and effort since utilities are not receptive to providing energy use records and costs for access to records can be significant. Senior government levels could play a role in enabling access to energy records by municipalities.

8. Contact Information

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C.3 Case Study: Toronto and the Greater Toronto Area (GTA)

1. Background

Municipalities within the Greater Toronto Area (GTA) have developed some of the most comprehensive clean air and GHG reduction programs in Canada. Although the City of Toronto initiated many of these programs, efforts have since spread to other municipalities within the GTA. Several of these programs are noted below (the jurisdiction of each program – e.g. GTA or Toronto – is provided in italics):

GHG Action Plan:
There are two main programs within the GTA that target GHG reductions:

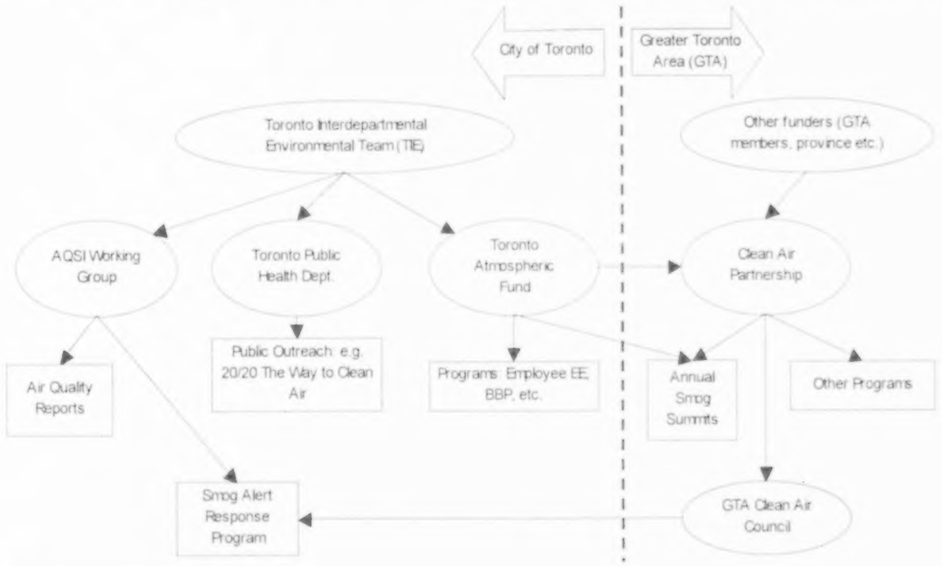
- **The Toronto Atmospheric Fund (TAF) -** ***Toronto*** was initiated in 1992 by a dedicated city councillor, with funds of $23 million from the sale of city property. TAF is a revolving fund that helps stimulate investment in projects that reduce GHG emissions and improve air quality (a revolving fund is a mechanism that provides low-interest loans to project proponents - proponents then repay the loans out of the savings stimulated by the project, thus maintaining the fund's principal). The idea was that a revolving fund would help the city meet its 1990 reduction commitment (see section 2). While its core mandate is oriented towards climate change and GHG emission reductions, TAF is heavily involved in clean air issues. Eligible grant applicants include City of Toronto agencies and departments; non-profit organizations; registered charities; public institutions and schools. TAF programs include the Better Buildings Partnership.
- **Clean Air Partnership (CAP) -** ***GTA*** is a registered charity launched at the 2000 Toronto Smog Summit. CAP's programs focus on engaging the communities within the Greater Toronto Area to reduce local GHG emissions and smog precursor emissions (building on lessons learned through TAF). Although CAP was originally created by TAF, it has since become an independent, "third party" entity that receives funding from a number of partners (including TAF). Each of CAP's programs is specifically designed to reach a target segment of the community.

Air Quality Management:
Specific air quality initiatives include the following:

- **GTA Clean Air Council (CAC) -** ***GTA***: a key program of CAP, the CAC supports initiatives that reduce air pollution in the GTA and shares best practices on smog reduction with municipalities across Canada.
- **Annual Smog Summit -** ***GTA***: This is an annual gathering of representatives from industry, the community and all levels of government in the GTA. Aimed at developing initiatives to reduce air pollution, the Summit encourages governments to commit to clean air initiatives by signing an Inter-governmental Declaration on Clean Air. This Declaration sets the stage for ongoing dialogue and the pursuit of solutions by all levels of government in the GTA, committing them to report back to the public at future annual summits. The Smog Summits continue to evolve as new initiatives are proposed and previous commitments are fulfilled.
- **Air Quality Strategy -** ***Toronto***: The City prepares annual reports that serve as a "report card" on the full range of City clean air initiatives.
- **Smog Advisories and Smog Response Plans -** ***Toronto***: Toronto advises the community of poor air quality days through the media. These warnings are often accompanied by recommendations on ways that citizens can reduce their personal emissions. The city also has a Smog Response Plan for municipal operations; staff are instructed to reduce activities that contribute to ground-level ozone formation and particulate emissions. This includes suspended and rescheduled activities, as well as energy conservation. The CAC has been working to develop a co-ordinated smog alert response plan among member municipalities of the GTA.

2. Planning, Organisation and Funding

The following diagram provides a general indication *(not comprehensive)* of the structure for GHG and clean air initiatives in Toronto and the GTA:


City of Toronto
Greater Toronto Area (GTA)
Toronto Interdepartmental Environmental Team (TIE)
Other funders (GTA members, province etc.)
AQSI Working Group
Toronto Public Health Dept.
Toronto Atmospheric Fund
Clean Air Partnership
Air Quality Reports
Public Outreach: e.g. 20/20 The Way to Clean Air
Programs: Employee EE, BBP, etc.
Annual Smog Summits
Other Programs
Smog Alert Response Program
GTA Clean Air Council

GHG Action Plan

1. **Commitment - *Toronto*:** In 1990, Toronto City Council committed to an overall reduction of the city's GHG emissions by 20 % below 1998 levels by the year 2005. At this time, they joined ICLEI's Cities for Climate Protection (CCP) initiative. They later joined the FCM's PCP initiative.
2. **Setting goals - *Toronto*:** *(Milestone One – PCP): Creating a GHG Emissions Inventory* and *(Milestone Two – PCP): Setting an Emissions Reduction Target* (See section 3 below). A target of 20% GHG reductions from 1990 levels was established at the time of commitment – this was the early methodology for ICLEI's CCP initiative. In 1998, this target was reaffirmed by city council after amalgamation.
3. **Implementation**:

TORONTO:

i. TAF was Toronto's first program to fund energy efficiency retrofits targeted at reducing GHG emissions. Other programs were soon developed. The TAF is an arms length agency whose Board of Directors is appointed by City Council and annual budget is reviewed and approved by Council, but whose operations are conducted autonomously.

ii. The Environmental Interdepartmental Team (TIE) provides a corporate-wide, co-ordinated, problem solving and information sharing forum for the City's environmental issues and initiatives, as well as reinforcing and promoting environmental stewardship and sustainability within the Corporation.

iii. The Employee Energy Efficiency Program is a three-year corporate initiative that provides opportunities for City employees to undertake energy efficiency improvements in their homes to reduce production of GHGs and other harmful smog emissions.

GTA:

i. CAP works in partnership with utilities, businesses, governments, schools and community groups. As indicated above, it is a registered independent charity managed by full-time staff and a board of directors.

ii. CAC was initially established as a working group by signatories for the Inter-governmental Declaration on Clean Air at the 2000 Smog Summit held in Toronto. Partners in the CAC include Environment Canada, Health Canada, Natural Resources Canada, Transport Canada, Ministry of the Environment, Ministry of

Transportation, and 23 municipalities.

4. **Monitoring/Evaluation - *Toronto*:** GHG reduction inventories were most recently developed in *Toronto's Emissions Reductions 1990-1998 and the Future Outlook*

Air Quality Management

1. **Research - *Toronto*:** In 1996 a council-driven report was published on the local health impacts of poor local air quality in Toronto. Council established an Anti-Smog Working Group in 1997. In 2000, the City's Public Health department released a report that raised concern among Torontonians and gained wide attention from the media.
2. **Establish Plan - *Toronto*:** An Air Quality Strategy Plan was produced by an Environmental Task Force made up of City Councillors and staff, and representatives from environmental agencies, business, labour, school boards, universities and schools across Toronto. An Air Quality Strategy Interdepartmental Working Group (AQSI Working Group) was then formed and remains the current lead on this issue. Representatives include the Chief Administrator's Office, Corporate Services, Economic Development, Culture & Tourism, Toronto Public Health, Urban Development Services, Works & Emergency Services, as well as representatives from GO Transit, the TAF and the Toronto Transit Commission.
3. **Implementation –**

   ***GTA*:** The first *Smog Summit* in 2000 was funded by TAF and other corporate and governmental sponsors, including Toronto Hydro, Enbridge Gas and Environment Canada, with the goal of exploring ideas and finding solutions to improving air quality in Toronto. Participants in the conference included representatives from the Provincial and Federal governments and citizens and leaders from business, labour, health and non-profit community groups. This summit is now held annually. There are many subsidiary initiatives ongoing as a result of this Summit. *The Cool Schools Program* and *The Clean Air Consumer Guide*, are other examples of programs led by CAP.

   Toronto: *20/20 - The Way to Clean Air* is a social marketing campaign developed by Toronto Public Health in cooperation with a wide range of partners including the Ministry of the Environment, Environment Canada, Toronto Atmospheric Fund, GO Transit, non governmental organizations (NGOs), Enbridge Gas Distribution and Toronto Hydro. The program is now being rolled out to GTA member municipalities.
4. **Monitoring/Evaluation - *GTA*:** A) Air Quality Strategy Reports are produced to track progress on air quality in the GTA. B) Clean Air Inventory - 2nd edition of Governments' Actions on Clean Air in the GTA provides a comprehensive description of clean air initiatives being undertaken by members of the GTA Clean Air Council, other municipalities within the GTA, the province, and the federal government.

3. Data Gathered (inventory and baseline)

GHG Action Plan - Toronto

- In 1999, the TAF and the City's Air Quality Improvement Branch produced a study entitled *The City of Toronto's Corporate Energy Use and CO2 Emissions, 1990-1998: A Progress Report*. This study was a cooperative effort to quantify the City's corporate energy use and GHG emissions for 1990 and 1998. The scope of the analysis covered the amalgamated city, focusing on the City's corporate operations, including selected agencies, boards, and commissions. However, the analysis did not include the Toronto Transit Commission or Toronto Hydro.
- In 2000, TAF and ICLEI Energy Services quantified the opportunities for cost savings in specific City owned buildings and facilities in a report entitled *Opportunities for Budget Cost Savings in the City of Toronto's Corporate Facilities*. This report builds upon the work done in these earlier reports by addressing the potential for procurement of green energy and the development of on-site co-generation capacity. It also extends the inventory to include emissions and reduction opportunities from landfill and solid waste management operations as well as the TTC and Toronto Hydro.
- In 2002, an updated report was published: *Moving Beyond Kyoto: Toronto's Emissions Reductions 1990-1998 and the Future Outlook* outlined the GHG emission reductions from the City of Toronto's energy use and waste management operations, and forecasts made for emission reductions that could be achieved by 2010 through the implementation of a number of energy and emission reduction measures. The forecasts reviewed energy use in city owned buildings, streetlights, vehicle fleet, water services, solid waste services, and green procurement.

Air Quality Management - Toronto

- The AQSI Working Group of 2001 undertook a detailed inventory of actions and programs currently underway that are intended to reduce air pollution. It should be noted that some programs included in this inventory, particularly in the area of energy, were originally designed to combat GHGs
- Smog Response Plans: Monitoring Air Quality - the city uses real-tine data available online from the Ministry of Environment's (MOE) website. They use an Air Quality Index (AQI) as a rating scale for outdoor air. Based on data from its network of air monitoring stations, the MOE reports an AQI for many communities across Ontario to all major media outlets and the Ministry web site several times daily. Six key air pollutants are monitored: sulphur dioxide, ozone, nitrogen dioxide, total reduced sulphur compounds, carbon monoxide, fine particulate matter. The city also studied reports to the National Pollutant Release Inventory, and estimated that reporting facilities in

Toronto represent approximately 20% of local air emission releases from point sources.

4. Implementation and Results Achieved

A small selection of the results achieved, for both Toronto and the GTA, are outlined below

Toronto:

- TAF's endowment has financed - at no taxpayer expense – carbon dioxide emission reductions totalling upwards of 225,000 tonnes -equal to about half the City's annual energy-related emissions.
- Projects financed by TAF loans have saved the City $17.5 million in corporate expenses - over $2.7 million annually - in cumulative energy and maintenance costs.
- Other benefits of TAF funding include: cleaner air; jobs in the construction trades; safer and more energy-efficient street and lane lighting; energy efficiency upgrades to 100 City-owned buildings; "greening" of schools across the City; energy efficiency green-ups of over 12,000 homes, demonstrations of new clean technologies such as solar cells, hybrid electric cars and electric bicycles.
- Better Buildings Program (BBP) – has facilitated retrofits of over 460 city owned and non-city owned buildings.
- Matching investments by building owners and managers of $126 million produced annual energy savings of $19 million and created 3,800 person-years of employment.
- Better Transportation Partnership (BTP): a program aimed at accelerating the replacement of the in-house vehicle fleet of the City, its Agencies, Boards and Commissions. The program currently offers the opportunity to acquire one additional light duty dedicated Natural Gas Vehicle for every four dedicated Natural Gas vehicles purchased or leased. The cost of the additional vehicles acquired under the BTP is recovered from the avoided fuel costs.

GTA:

- At the 2000 Smog Summit, three orders of government (Federal, Provincial and City of Toronto) signed the Toronto Inter-Governmental Declaration on Clean Air, the first of its kind in Canada. The Declaration promised ongoing dialogue among signatories, and ended with a commitment to report back to the public at future annual summits. The Declaration set the stage for Smog Summit II and the expanded involvement by other municipalities in the Greater Toronto Area.
- Clean Air Online (CAOL): CAP is managing development the GTA CAOL web site that will provide information and tools that encourage and support individual, community and municipal actions to reduce air pollution and GHG emissions. CAOL will contain information on air quality and climate change activities taking place in the GTA and will provide users with: an understanding of the linkages between decisions on transportation and energy use and smog, human health and climate change; strategies that enable people to take action to reduce their own emissions and protect their health and the environment; information on air quality and notification of smog alert days in the GTA; and a searchable database on actions being taken by governments, at all levels, and the community to improve air quality and combat climate change.
- A report, Green Power Opportunities for the GTA Clean Air Council, has been completed. The report recommends implementation options including purchasing electricity from renewable sources and opportunities for local and self-generation of sustainable power, especially landfill gas recapture and wind power. As Phase 2 of the GTA-wide Renewable Energy Portfolio Standard initiative, in cooperation with the generators of sustainable power in Ontario and local community groups, the GTA Clean Air Council will explore the feasibility of the various implementation options described in the report.
- Fuelling Clean Air: Municipal Fuel Purchasing Policies That Improve Air Quality and/ or Retard Climate Change has been completed in collaboration with the Ontario Public Health Association. The report to the GTA-CAC recommended purchasing low sulphur fuel for use in corporate fleets of off-road vehicles during the next fuel tendering cycle, achieving emissions reductions and costs associated with purchasing and developing joint implementation strategies.

5. Integration – Air Quality and GHG

Toronto

- Toronto's air quality planning activities are heavily integrated across divisions, departments, and share objectives. The report, *Governments' Actions On Clean Air In The Greater Toronto Area 2003*, by the Clean Air Council demonstrate how air programs at all levels of government are integrated together. The Smog Alert / Response program in particular is integrated with the province of Ontario's Air Quality monitoring framework, and there are air quality stations in 5 locations in the city. In addition, the province developed the Municipal Response Guide for Smog Alerts to support municipal initiatives in responding to smog. The Province has introduced new legislation (Regulation 127) to make it compulsory for larger industries to monitor and report on the pollutants that comprise the air quality index criteria (AAQIC). This requirement will be phased in by the industry sector and should yield valuable data that the City can use in its monitoring and modelling of emissions from point/stationary sources.

GTA

- The CAC is currently developing an Integrated Inventory, Modeling, and Monitoring Program for climate change, air quality, smog and sprawl. The first phase is expected to be completed by the fall and will provide actual base case information in light of various improvement scenarios, (including alternative power supply sources, reduced car and truck pollution and land use changes).
- The most recent Smog Summit (2003) was entitled "Smog and Energy Use - Make the Connection", directly tying energy use with clean air and GHG emission reduction strategies.

6. Lessons Learned

The following lessons learned emerge from this case study:

- **Long-term core funding is very helpful.** The presence of stable, long-term funding greatly assists municipalities in developing effective programs. In Toronto, the $23 million sale of public lands allowed the City to launch the Toronto Atmospheric Fund, and the revolving fund that TAF uses to fund many of its operations and activities. This stable funding allows TAF's programs to operate independently of year-to-year budget shifts, thus enabling TAF to develop long-term programs appropriate for chronic issues such as clean air and GHG emission reductions.[14]
- **Third-party multi-stakeholder bodies are useful.** In many cases, the creation of an independent third-party body helps to stimulate action. Involvement of the community and private and public sector stakeholders also helps to ensure that decisions are transparent and have the buy-in of all involved. TAF's arm's-length status has helped the organisation co-ordinate action among various public and private sector stakeholders. In the GTA, the Clean Air Partnership's status as a registered charity provides them a neutrality that greatly facilitates its coordination role in implementing programs among competing municipalities and divergent interests (something that a municipality, being a vested stakeholder itself, would not be able to do.)
- **Senior engagement is required.** The active involvement of senior officials (both elected and staff) is a necessary element for both program launch and ongoing implementation. In Toronto, the formation and ongoing success of TAF is credited in large part to the active support of councillors and senior staff.

7. Senior Government Roles and Issues

- **Funding assistance.** Provinces could assist municipalities in establishing core funding for integrated initiatives. This could be done by providing seed capital for revolving funds such as those used in Toronto. A representative in Toronto suggested that provinces consider allowing municipalities to invest financial savings in energy efficiency projects, rather than in bank accounts as is currently required.
- **Assistance in data acquisition and measure identification.** Municipalities encounter difficulties in acquiring data (notably utility data) and in identifying "best opportunities" for action. Provinces could play a role in facilitating access and in supporting initial identification of action. For example, the Ontario provincial government is currently assisting the GTA with a software-based assessment of best measures to reduce air pollutant emissions in two pilot municipalities.

8. Contact Information

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[14] Edmonton Alberta has a similar fund that it uses to fund energy efficiency initiatives.

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APPENDIX D: LESSONS LEARNED

As identified in Section 2.3, the lessons learned from the Case Studies were sorted into four issue categories. This appendix provides the long list of lessons learned sorted by issue category. Note that in some cases, the text of the lesson learned, as identified in the Case Study documentation, has been edited. Editing of text was done for brevity and where a lesson learned fell into more than one issue category. The reader is referred Appendices B and C, which contain the full text of the Case Study documentation.

The issue categories and lessons learned from the case studies are:

D.1 Organization and Stakeholder Involvement

The Usefulness of Using Independent and Largely Autonomous Multi-stakeholder Input for Decision Making

- Industry has been very co-operative and actively engaged in the process. Industry has been willing to share data, assist with funding and engage in committees to develop solutions. [Bulkley Valley – Lakes District]
- The local environmental group (CHOKED) has been an important advocate for improved air quality and a catalyst for the process. [Bulkley Valley – Lakes District]
- Third-party multi-stakeholder bodies are useful. In many cases, the creation of an independent third-party body helps to stimulate action. Involvement of the community and private and public sector stakeholders also helps to ensure that decisions are transparent and have the buy-in of all involved. [Toronto and the Greater Toronto Area]
- Coordination by an autonomous, stable group helps. The Office of Sustainable Development (with a staff of 30) has developed into a semi-autonomous group with access to both tax-based funds and external funds for "opportunistic" projects. This has enabled OSD to drive a wide variety of long-term initiatives. [Portland, Oregon]
- QES acts like a board of directors for the process and gives approval for spending. This has been a very successful arrangement. The committee structure is a true roundtable where everyone is equal. Decision-makers connected directly to technical people in MWLAP. [City of Quesnel]
- The consensus-based air quality planning process was very successful due in part to the work of local environmental group spearheading the project. WLAP not leading the process but offering technical advice. [City of Quesnel]
- The use of specific emissions working groups (road dust, resource burning) has been very positive and very useful suggestions have come out of these groups. A one time meeting on road dust was the first time that road dust related operators had come together to discuss issues and solutions. [Bulkley Valley – Lakes District]

Also, a cautionary note on Multi-Stakeholder committee composition was sounded:

- Keep it Personal - Need a sense of ownership from those who will implement it. Too much external involvement may be counterproductive (including excessively influential developmental input from parties unwilling or unable to subsequently contribute to implementation). [City of Kamloops, BC]

Ensure High Quality Organizational Links and Stakeholder Engagement

- Engage multiple stakeholders when community initiatives are being undertaken; written commitments by senior corporate officials opens doors and saves time. [City of Greater Sudbury]

- Nurture Organizational Links - A CEP thrives on partnerships between municipal, utility companies and other organizations, and depends on active engagement from all sides. [City of Kamloops, BC]
- The Quesnel environmental community and local industry work co-operatively and have built lasting partnerships. In addition, many of the large industrial employers are engaged in the community projects and are thinking beyond their own corporate concerns to the wider community. [City of Quesnel]
- Quesnel has many local people and groups who care deeply about the community and are committed to environmental improvements. The environmental community and local industry work co-operatively and have built lasting partnerships. In addition, many of the large industrial employers are engaged in the community projects and are thinking beyond there own corporate concerns to the wider community. [Quesnel]
- Engage multiple stakeholders when community initiatives are being undertaken; written commitments by senior corporate officials opens doors and saves time. [Greater Sudbury].

D.2 Messaging and Focus

The Importance of Common, Clear and Simple Messaging

- A strong communication plan and "rules of engagement" regarding committee participation have also helped to ensure that the process has been a positive one. [Bulkley Valley – Lakes District]
- Sometimes a focus on one issue can build momentum and commitment, where the spreading out of the resources and intent across many can dilute the focus. Vancouver City Council in particular likes the focus on climate change at this time. Vancouver's GHG work has focused Council and staff on many issues such that great progress is being made. [City of Vancouver]
- This will be a living plan – right now the committees are focusing on reducing emissions from six sources but the focus may change over time depending on community priorities. Once a year there will be an evaluation of the plan to ensure local concerns are being met. [Bulkley Valley – Lakes District]
- The Whistler plan is significant in that it is part of a broader sustainability initiative (CSP) which is using the Natural Step as a organizing framework. This seems to have worked well for the community and has created a relatively straightforward set of principles that the community has been able to rally around. [Resort Municipality of Whistler]

The Importance of Focusing Effort on Actions That Deliver Multiple (Complementary) Benefits

- Identifying actions that have multiple benefits and focusing on actions that have both GHG and air quality improvements is a key avenue for success. [Greater Vancouver Regional District]
- In general, the GVRD attempts to look for and focus on complementary measures. Energy efficiency, for example, does help for both GHG and air quality issues. [Greater Vancouver Regional District].
- Two Issues Groups of specific relevance to air quality, GHGs and energy planning included: SRI Air Quality and Greenhouse Gas Management Issues Group who put together a Goals, Strategies, Actions and Implementation Priorities report (May, 2003) and the Energy Task Group which created a report as well (May 2003). Both Issue Groups identified opportunities for synergy and harmonization for integration of air quality-related initiatives and relatedly, developed a guiding principle that 'actions should have multiple benefits that promote overall sustainability'. Recommendations and principles from the Issue Groups reinforce strategic directions in the Greater Vancouver and Fraser Valley AQMP. [GVRD]

- There are many costs and benefits associated with addressing energy and emissions issues. The city needs to find its best path through these, focusing strategically on benefits and leveraging other programs. [City of Vancouver]
- Sudbury identified energy cost savings and additional "co-benefits" in terms of local job creation and energy independence. [City of Greater Sudbury]
- There are many benefits to integration, including: the data gathered for any of the plans, informs all the plans (air quality, energy, emissions, sustainability); the momentum and learning triggered by one can be built upon with others; staff teams for one are almost the same for the others, and as such, streamlining the plans can streamline staff resources; consultants able to consult on one, are likely knowledgeable on the others, or their work can be easily transferred with some additional work; and others. [City of Vancouver]
- While the Community Energy Options Report recognizes the clear links between energy, GHGs and air quality, community energy planning and air quality planning in Quesnel (and area) have been largely separate exercises. Air quality issues are a higher priority in the community. However, energy and GHG reductions strategies that align with local air quality objectives are likely to be supported. [Quesnel]
- The completion of the PCP Milestones can be effectively achieved through a community energy planning process. Some of the milestones
- Since the City of Kamloops is ready to develop a Local Action Plan for step 3 of the PCP process, it is currently trying to integrate the working elements of the CEP with the PCP program (GHG Action Plan). This will provide an elegant and practical way of overcoming barriers to implementation of the outstanding and worthwhile aspects of the CEP, since the benefits are:
  - levers the benefits of an existing, successful organizational structure (responsible for implementing the PCP program);
  - ensures an umbrella view of energy activities;
  - increases efficiency and productivity, since greenhouse gas emissions correlate with energy consumption
  - will have direct exposure to Council, increasing the potential to justify proactive measures to reduce energy use;
  - will act as both an internal communications conduit and a feedback mechanism to the various City departments;
  - is supported by all participants.
- In a community that has multiple challenges, taking an integrated approach leads to more robust solutions. For example, a combined heat and power facility not only reduces solid waste, but also improves a company's financial bottom line and improves air quality. [Quesnel]
- In Sudbury, proponents were able to convince Council to allocate significant up-front capital based primarily on the energy savings, with additional "co-benefits" in terms of local job creation and energy independence.
- GTA's most recent Smog Summit (2003) was entitled "Smog and Energy Use – Make the Connection", directly tying energy use with clean air and GHG emission reduction strategies.

A number of potential conflicts were also mentioned. These include:

- One cannot assume that initiatives to reduce GHGs also improve air quality but most often it is true. There is the concern that working to improve GHGs will result in poorer air quality. Conflict examples include:
  - replacing gasoline engines with diesel engines will reduce GHGs but result in poorer air quality
  - wood, considered GHG neutral, can lead to reduced air quality

  - emission control devices used to reduce CACs use energy and, therefore, increase GHG emissions.[GVRD]
- The GVRD's prime mandate is air quality, with GHGs secondary. The BC Waste Management Act doesn't exclude GHGs but health (and therefore air quality) is the primary driver.

The Potential to Use Energy as a Focal Point

- Energy provides a good focal point. Portland's experience indicates that a great deal can be done on energy supply and demand before there is a need to "trade off" with GHG and clean air concerns. The inverse is not necessarily true: a program to reduce industrial air contaminant emissions will often increase energy use and GHG emissions. [Portland, Oregon]
- Energy provides an excellent starting point [City of Greater Sudbury]
- Air issues planning (GHG and CEP) can be promoted on the basis of economic benefits alone. [City of Greater Sudbury] (This lesson is also identified under Clear Messaging, above; note that the economic benefits to Greater Sudbury are attributable to energy cost reductions and economic opportunities from alternative energy sources.)
- In remote communities such as Hartley Bay, energy costs and reliability are generally much larger concerns that climate change or air quality concerns and therefore there is little appetite to address air quality or GHG issues unless they are synergistic with initiatives to improve energy reliability and cost. [Hartley Bay – Gitga'at First Nation]
- One cannot assume that initiatives to reduce GHGs also improve air quality but most often it is true. The GVRD attempts to look for and focus on complementary measures. Energy efficiency, for example, does help for both GHGs and air-quality issues. GVRD recognizes that energy efficiency itself is not going to be enough to address worrying trends in both GHGs and CACs because efficiency gains are generally overwhelmed by other changes such as increased consumption, increased vehicle size and population growth. [Greater Vancouver Regional District]
- The major challenge for Whistler has been how to account for and influence energy use and emissions from the dominant tourism sector including energy used and emissions derived from transportation outside the municipal boundaries. [Resort Municipality of Whistler]

Some cautions to note in considering an energy focus were also identified:

- There is a concern that focusing on GHGs and energy related issues may jeopardize the air-quality planning success. [City of Quesnel]
- Having mandated authority to regulate air quality provides a strong hook on which to build other initiatives. However, without mandated authority to deal with GHGs and energy the GVRD is limited in how effectively it can integrate air quality (its primary responsibility) with GHG and energy issues. [Greater Vancouver Regional District]
- Sometimes there are conflicting objectives between the plans, primarily between GHG and energy or sustainability. Some initiatives to reduce GHG emissions may not immediately direct energy systems or sustainability priorities in the same way. For instance, using electricity for heating in BC will lower emissions below that used for gas; using compact fluorescent light bulbs that produce less heat may increase gas-heating loads; using diesel fuel reduces emissions but increases air quality particulates. [City of Vancouver]

The Importance of Early Action and Building on Success

- The environmental legacy of Sudbury has assisted in moving initiatives forward…Use pilot projects to make identifiable gains and use these to sell additional phases. [City of Greater Sudbury].

- The GVRD found that it was important to develop initiatives that provide municipalities realistic opportunities to reduce and measure emission reductions (AIR2000 initiatives such as Eco-Smart Concrete, Better Buildings Program etc.) before embarking on the work to develop GHG action plans. [Greater Vancouver Regional District]
- Even before completion of the plan, there have been some early successes in developing measures that are likely to succeed – these include developing road dust management best practices and slash burning best practices. The committees have been very action oriented and the process has developed lots of momentum. The community level partners remain excited by the possibilities. [Bulkley Valley – Lakes District]
- The Whistler community has already begun the process of implementation, and recommendations from the Integrated Energy Plan will be implemented through other municipal planning initiatives such as the transportation strategy, waste management planning and the CSP which will lead to an update in the OCP.

"Selling" Initiatives Based on Local Priorities (especially economics)

- Air quality is handled by the state and there has not been a great deal of explicit integration between the state initiatives, and Portland's sustainable development work. Portland implements a variety of initiatives that have a range of benefits (including clean air) all under the roof of sustainability, although each individual action is "sold" on whatever works best in that particular context: clean air, energy, reduced congestion, liveable cities etc. [Portland].
- There are many costs and benefits associated with addressing energy and emissions issues. The city needs to find its best path through these, focusing strategically on benefits and leveraging other programs. [City of Vancouver]
- Points to the need to develop economic incentives for GHG/energy-related projects (e.g., co-generation). [Bulkley Valley - Lakes District].
- (There are) opportunities for local economic development for the community and for the municipality itself.
- (E)vidence indicates that energy-related investments can almost always be justified on a financial basis. [Portland].
- The driving factor in obtaining commitment to initiatives is the economic case for savings, cost avoidance, and greater economic diversity of the community. Detailed baseline analysis underpins all planning decisions. [Greater Sudbury].
- Air issues planning (GHG and CEP) can be sold to political staff on the basis of economic benefits alone. Council instituted a policy change allowing for this long-term investment, and provided the long-term funding that served as the backbone for subsequent measures. [Greater Sudbury].

Incorporating Air-Issues Planning into Broader Planning Processes and Management Systems

- Avoid Duplication - where possible, integrate the plan with parallel programs (e.g. environmental management systems, sustainability indicator tracking programs etc) to improve efficiency, data consistency and relevance. [City of Kamloops, BC]
- The community has already begun the process of implementation and recommendations from the Integrated Energy Plan will be implemented through other municipal planning initiatives such as the transportation strategy, waste management planning. [Resort Municipality of Whistler]
- An Eco-Industrial Network proved to be a useful way to approach issues of energy and GHGs as part of a broader initiative to address economic and community development. The District expects to focus on establishing broad policy goals so that all subsequent by-laws, regulations and development

requirements reflect the directions discussed during the Maplewood Project. In short, thinking ahead to potential changes required in mainstream documents (i.e., OCPs) and associated regulations. [District of North Vancouver]

- The City's approach to these issues involves a dialogue with a variety of complementary planning processes: Greenhouse Gas emissions reduction (Climate Change) planning; Regional air quality planning; Sustainability Action Planning process; Regional and local transportation planning; and Green development and green building initiatives. It is not clear whether any one of the above planning initiatives were driven by any of the others, but they are all working together and assisting in both dealing with related issues and maintaining momentum and leveraging resources. [City of Vancouver]
- The Sustainability Action Plan will assume an overall framework for many of the initiatives, but it is expected that because of the different stakeholder negotiation tables associated with each, that they will likely remain separate plans. [City of Vancouver]
- Integration of these different plans into other community planning and regulatory initiatives include: All neighbourhood planning processes; Green development and green building policy and regulations; Water and waste water management plans; Solid waste management plans; All aspects of transportation plans; Various specific projects, from infrastructure to major neighbourhood planning processes; Corporate communications initiatives; City facilities planning; Capital planning; Operating budgets planning – particularly for resourcing city staff teams required to plan and implement these programs. [City of Vancouver]
- The Whistler plan is significant in that it is part of a broader sustainability initiative (CSP) which is using the Natural Step as a organizing framework. This seems to have worked well for the community and has created a relatively straightforward set of principles that the community has been able to rally around. [Resort Municipality of Whistler].

D.3 Leadership and Champions

The Need to Gain Senior Political and Administrative Engagement

- Senior engagement is required. The active involvement of senior officials (both elected and staff) is a necessary element for both program launch and ongoing implementation. In Toronto, the formation and ongoing success of TAF is credited in large part to the active support of councillors and senior staff. [Toronto and the Greater Toronto Area]
- Engage political staff from the beginning directly in program development to create champions at the decision-making table; the success of Sudbury's initiative is attributed to the overwhelming commitment of senior officials, councillors, and the city's method to use a signed declaration or "social contract" for partners to pledge their support for the initiative. [City of Greater Sudbury]
- Role of GVRD staff is critical to identifying opportunities for integration. Much of the work outside the mandated responsibility of the organization is lead by planning staff that demonstrate an inclination to integrated approaches. [Greater Vancouver Regional District]
- Use pilot projects to make identifiable gains and use these to sell additional phases. [City of Greater Sudbury]

Also, a cautionary note was sounded regarding champions in isolation of process change:

- Don't Totally Rely on Individual Champions - Although champions can be invaluable in making change happen, ensure that the knowledge and policies contained within CEPs are effectively institutionalized to ensure they will withstand changes to staff and local government officials. This includes greater integration of energy priorities throughout the OCP. [City of Kamloops, BC]

- The hiring of a facilitator has been critical to the success of the project so far. However, there has been perhaps too much reliance on facilitator and funding for this position will not last indefinitely. Funding for co-ordination is essential for long-term success. [Bulkley Valley – Lakes District]

The Importance of Champions, Staff and Consultants Attuned to Integration

- A municipal champion is critical. Quesnel has a very strong sustainability champion. He is been a strong supporter of the CEP and is now championing a biofuels initiative. [City of Quesnel]
- Two Issues Groups of specific relevance to air quality, GHGs and energy planning included: SRI Air Quality and Greenhouse Gas Management Issues Group who put together a Goals, Strategies, Actions and Implementation Priorities report (May, 2003) and the Energy Task Group which created a report as well (May 2003). Both Issue Groups identified opportunities for synergy and harmonization for integration of air quality-related initiatives and relatedly, developed a guiding principle that 'actions should have multiple benefits that promote overall sustainability'. Recommendations and principles from the Issue Groups reinforce strategic directions in the Greater Vancouver and Fraser Valley AQMP. [GVRD]
- Role of GVRD staff is critical to identifying opportunities for integration. Much of the work outside the mandated responsibility of the organization is lead by planning staff that demonstrate an inclination to integrated approaches. [GVRD].

D.4 Resources and Capacity

The Need for Long-term Resources

- The presence of stable, long-term funding greatly assists municipalities in developing effective programs. In Toronto, stable funding from the revolving fund enables TAF to develop long-term programs appropriate for chronic issues such as clean air and GHG emission reductions. [Toronto and the Greater Toronto Area]
- Sudbury, proponents were able to convince Council to allocate significant up-front capital based primarily on the energy savings. Work by an external consultant identified a $4.5 million package of investments with a 7-year payback. Council instituted a policy change allowing for this long-term investment, and provided the long-term funding that served as the backbone for subsequent measures. [City of Greater Sudbury]
- Access funding available for feasibility studies (e.g. Municipal Green Funds). [City of Greater Sudbury]
- Communities and municipalities, in general, have difficulty accessing information and funding for energy-related initiatives. Communities of the scale and remoteness of Hartley Bay have even greater challenges than most. Initiatives reviewed in this effort included a micro-hydro power station. Again, the capital resources required for projects of this nature are prohibitive for most and especially prohibitive for a community of this size. [Hartley Bay – Gitga'at First Nation]
- Climate Change planning has and is requiring significant funding including staff time, technical consultants and a large consultation team. It also requires significant project management expertise within staff. There is some government money available for projects and possibly some to assist in staffing costs, but it takes time to get that money and it often comes with strings attached. [City of Vancouver]

The Need to Build a Base of Strong Technical Capacity

- The technical expertise that the GVRD offers, especially baseline/inventory assistance is critical, especially for smaller municipalities that do not have the resources for this work. [Greater Vancouver Regional District]
- Role of GVRD staff is critical to identifying opportunities for integration. Much of the work outside the mandated responsibility of the organization is lead by planning staff that demonstrate an inclination to integrated approaches [Greater Vancouver Regional District]
- The CNV, through the incorporation of the LEC and the formation of a public-private partnership with the Terasen Corporation, offers a level of experience and expertise valuable to the Province and other BC municipalities. There is a noticeable lack of capacity and capability in BC municipalities to conceive and/or implement energy-related projects. Also, there is very little experience in BC municipalities in planning energy utilities from a technical and business perspective. [City of North Vancouver]
- Addressing these issues requires expertise far beyond what most municipal engineering or planning departments have, including hiring new staff and often consultants. [City of Vancouver]
- The hiring of a facilitator has been critical to the success of the project so far. However, there has been perhaps too much reliance on facilitator and funding for this position will not last indefinitely. Funding for co-ordination is essential for long-term success. [Bulkley Valley – Lakes District]

Don't Reinvent The Wheel

- It may not be necessary to develop monitoring programs specifically for energy activities. Using existing or off-the-shelf tools, such as those offered by the FCM, saves time and resources. [Kamloops]
- This is also a great theme to take the opportunity to showcase, and encourage the use of, existing tools (CEP Toolkit/Template; Guide to Airshed Planning; FCM PCP materials). [Kamloops]

Importance of Implementing Good Monitoring and Reporting

- Invest in solid baseline data collection for inventories. [City of Greater Sudbury]
- It is most important to establish a transparent and replicable reporting protocol for emissions to ensure future measurements are done in the same manner as the ones used to establish the baseline, so that progress reports on emissions reduction are accurate and defensible. [City of Vancouver]
- Use of an independent party (i.e. ICLEI) for inventory and reporting provides additional credibility to reporting on the progress. [City of Greater Sudbury]
- Integrate CEP-tracking measures into the City's regularly reported key performance measures. [City of Kamloops, BC]
- Integrating energy, air quality and greenhouse gas planning in Whistler is more straightforward that in most municipalities because almost all emissions are fuel based. Unlike many other communities that have significant agricultural and industrial emissions, Whistler emissions are predominantly from the commercial, residential and transportation sectors. Therefore, creating a reliable integrated energy and emissions inventory was relatively simple. GHGs and CACs could be reliably estimated using standard conversion factors. [Resort Municipality of Whistler]
- In order to get accurate transportation emissions, it is the City's and GVRD's intent to request that the province require mileage data to be entered as a prerequisite for auto insurance renewals through ICBC, so that mileage can be cross referenced by postal code for all municipalities in the GVRD. [City of Vancouver].

- The Greater Toronto Area (GTA) is currently developing an Integrated Inventory, Modelling and Monitoring Program for climate change, air quality, smog and sprawl. The first phase is expected to be completed by the fall and will provide actual base case information in light of various improvement scenarios (including alternative power supply sources, reduced car and truck pollution and land use changes).

Challenges for Smaller, Isolated Communities

- Communities and municipalities, in general, have difficulty accessing information and funding for energy-related initiatives. Communities of the scale and remoteness of Hartley Bay have even greater challenges than most. Again, the capital resources required for projects of this nature are prohibitive for most and especially prohibitive for a community of this size. [Hartley Bay].
- Communication and continuity were a challenge in this project. For example, part way through the CEP process, a new diesel-fuelled power plant arrived for the community's use. This was not only a surprise for the Pembina Institute, but also a surprise for some of the community members involved in the process. [Hartley Bay].
- In remote communities such as Hartley Bay, energy costs and reliability are generally much larger concerns than climate change or air quality concerns and therefore there is little appetite to address air quality or GHG issues unless they are synergistic with initiatives to improve energy reliability and cost. [Hartley Bay].

APPENDIX E: THE ROLE OF SENIOR GOVERNMENTS

This section identifies five categories of recommendations for the role of senior (Provincial and Federal) governments to facilitate integrated air quality related planning. The Union of British Columbia Municipalities (UBCM) is an invaluable stakeholder in supporting integrated planning at the local government level. The following steps would be contemplated n collaboration with, and refined based on subsequent direction from, UBCM. These steps include:

1. Establish a supportive environment for integrated air issues planning;
2. Directly assist municipalities to undertake integrated air issues planning (technical capacity);
3. Work with industry partners and community support;
4. Increase financial capacity and affordability aspects; and
5. Provincial and Federal Government Partnerships.

E.1 Establish a Supportive Environment for Integrated Air Quality-Related Planning

Perhaps the most important role for the provincial (and federal) government is to establish a policy and regulatory environment in which an integrated air quality-related planning process makes sense to local communities. There has already been some significant progress in this regard with the adoption of the National Climate Change Business Plan, Canada's Climate Change Plan and associated funding measures, the Province's Energy Policy[35], which confirms a commitment to greenhouse gas management, and the Ministry of Water, Land and Air Protection's (MWLAP) service plan, which states a commitment to limit air pollution and contribute to developing a climate change strategy[36].

The new *Environmental Management Act (EMA)* will strengthen the Province's influence by giving the Minister responsible the authority to require area-based planning where deemed necessary.[37] The GVRD has also made steps towards integration by adopting the Sustainable Region initiative as a framework for reviewing the region's AQMP.

Additional measures could also benefit an integrated approach including:

- **Harmonizing Air Quality, Climate Change and Energy Policy**
  At present, different provincial ministries manage air quality and energy portfolios. The MWLAP has responsibility for air quality protection in most of the Province under the *Waste Management Act*. Energy issues fall under the responsibility of the Ministry of Energy and Mines. In addition, a number of other federal and provincial departments, and local governments influence the implementation of measures including transportation, industrial emissions, energy resource development, etc. Harmonizing the policy direction of these ministries and recognizing both the co-benefits and possible conflicts that exist would be a first step in establishing clarity around the issues.

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[35] BC Ministry of Energy and Mines. November 25, 2002. *Energy for Our Future: A Plan for BC*; http://www.gov.bc.ca/em/popt/energyplan.htm

[36] Ministry of Water, Land and Air Protection Service Plan 2004/05-2006/07, http://www.bcbudget.gov.bc.ca/sp2004/wlap/
[37] http://legis.gov.bc.ca/37th4th/3rd_read/gov57-3toc.htm

In general, BC utilizes large amounts of high-grade energy (electricity) for low grade uses (space heating). There is an opportunity for the Province and the GVRD to encourage municipalities to use a grade of energy that matches the end use. Encouraging municipalities to follow the example of the City of North Vancouver's Lonsdale Energy Corporation, for example, could assist in this regard.

- **Required long-term planning.**
  Experience in Oregon suggests that state-level requirements for long-term planning can effect a long-term "culture change" within municipal governments. Portland's commitment to addressing climate change is rooted in state policies dating to 1973, when legislation required all Oregon communities to establish comprehensive plans addressing land use, transportation, parks, and energy, among other issues.

- **Regulatory Requirements**
  Currently, the provincial government (and GVRD) can regulate air quality emissions under the *Waste Management Act*. Specific regulations exist for ozone depleting substances, smoke and burning operations, vehicle and fuel emissions, and industrial emissions. The authority to regulate GHG emissions is less clear and this has produced a strong distinction between how CACs and GHGs are managed. Therefore, seeking clarity on how GHGs relate to the *Waste Management Act* (and new *Environmental Management Act*) would also assist in developing integrated plans.

  Municipalities have no direct regulatory power over air quality or GHG emissions and, therefore, have to use other measures at their disposal such as land use planning authority, and bylaws regulating backyard burning and use of woodstoves for example.[38]

  The Province could encourage the incorporation of an integrated approach to air quality, GHGs and energy into the Official Community Planning (OCP) process and other broader municipal plans such as transportation planning, especially ones that have regulatory requirements under provincial legislation (e.g. *Local Government Act*).

E.2 Directly Assist Municipalities to Undertake Integrated Air Issues Planning (Technical Capacity):

- **Integrated Air Issues Templates and Technical Standards**
  The Province should address the issue of templates strategically. The Province provides significant funding and oversees the regulation of many aspects of air quality, emissions and energy plans. Templates for AQMPs, CEPs or GHG action plans already exist from a variety of sources (including MWLAP, CEA, NRCan and FCM). Informed by the 'Suggested Framework for Integrated Air Quality Planning in this report (see 4.1), the Province could develop an integrated air issues planning template that would not only make it easier for local government to move on energy and emissions issues, but also assist to streamline the delivery of a wide range of provincial policy and programs.

  Technical standards for alternative energy supply equipment or related service contract templates would be of value to communities. Most municipalities have registered professionals (e.g., engineers, architects, planners) accustomed to working effectively with a variety of templates.

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[38] The City of Vancouver, under the Vancouver Charter can also set building energy efficiency standards in its building code. Other municipalities do not have the ability to do this at present.

Off-the-shelf approaches to energy and emissions-related issues would enhance local government efficiencies at all stages of air quality inventorying, planning, implementation and reporting.

- **MWLAP's Technical Role in Planning Processes**
  The case study research indicated that MWLAP staff (along with GVRD staff) currently play a pivotal role in air quality planning by providing technical expertise in the creation of air quality inventories and performing air quality monitoring. In addition, Environment Canada staff also undertake air quality monitoring in some communities. Municipalities will require even greater direct technical expertise if undertaking an integrated planning approach.

  Local governments often back off from innovative energy and emissions planning due to a lack of staff resources. Having access to knowledgeable in-house or other experts will continue to be critical to local government.

  The Province's technical support could be even more strategic. There is the potential to integrate a number of other programs or policies aimed at the local scale. These range from energy supply and energy efficiency to transportation infrastructure and building codes. The Province works with municipalities on many levels providing funding, expertise, and other types of support for projects, infrastructure and longer-term programs. Tremendous synergies and economies of scale can arise from coordinating technical input into, for example, building energy management, community infrastructure development and transportation systems.

- **Helping to develop energy-related capacity.**
  There is a general lack of capacity and capability within BC municipalities to conceive of and/or implement energy-related projects. This is due in part to a lack of history in engagement with energy projects (although the City of New Westminster is one exception where the City owns and operates a power utility) and a lack of internal capacity to deal with the energy/utility industry. Also, there is little experience in BC municipalities in planning local energy utilities from a technical and business perspective (although the City of North Vancouver is one exception where the City has developed a municipal energy corporation).

- **Enabling Data Access**
  Communities are finding many challenges in creating reliable air quality inventories and baselines for the PCP process. The Province can assist by motivating or requiring ICBC and their insurance delivery agents to record odometer readings for annual ICBC insurance registration and to report this information annually to respective municipalities based on the first 3 digits of the owner's postal code. This information would not only permit a regular and accurate reporting of transportation emissions (one of the largest sources of non-point source pollution and 42% of total GHG emissions in BC), but the extensive travel data would also enable more efficient transportation, and overall community, planning. Broad provincial access to such data would also enhance provincial accountability, providing additional information on the effectiveness of various transportation strategies. The City of Vancouver, with support from the GVRD, already plan to approach the Province on the issue.
- **One-window Information Centre**
  The practice of planning for energy and emissions is relatively new in many municipalities, and is often out-competed for Council attention by other pressing matters. Equally, the plethora of information on air quality-related planning processes is daunting to those few, if any, municipal staff who may have some expertise in energy or emissions management. Best practices information regarding the harmonized benefits of air quality, GHGs and energy-related projects would assist municipalities to undertake these efforts.

The provision of province or nation-wide sources or standards for best practices in emissions and energy planning, and one or more key portals to information from other municipalities can significantly increase the likelihood of establishing, let alone advancing, a municipality's air quality-related program. A "one –window" information centre provincial website would provide readily available and relevant documents to municipal staff or consultants. The creation of such a portal for standards and best practices would also improve the efficiency and effectiveness of program delivery from complementary provincial ministries.

- **Establish Measurement and Reporting Protocols**
  It is strategically important to establish a transparent and replicable reporting protocol for emissions to ensure future measurements are done in the same manner as the ones used to establish the baseline. This will ensure that progress reports on emissions reduction are accurate and defensible. Furthermore, it is important to have the measurement protocols inexpensive and capable of providing regular feedback on "successes" or general trends. Local government councils generally operate on a 3-year political term and need to see results for expenditure and policy initiatives within that time frame.

E.3 Work with Industry and Other Partners

As the sources for many emissions in smaller communities can be resource industries, the solutions lie in partnerships with these industries. The combination of local government and industry resources and tools can be effective.

- **Assist resource industries to participate in CEP and integrated planning with communities through:**
  - Tax and other incentives;
  - Training programs and educational initiatives for key industry staff;
  - Communication and promotion to industry and business associations; and
  - Enabling discussions between municipalities and industrial sectors (e.g. provide chair/ mediators/ negotiators/ facilities for discussions).

- **Work with Utilities to Expand Demand Side Management Programs**
  BC Hydro's PowerSmart program is highly beneficial to community energy planning initiatives. An integrated approach would benefit from similar DSM initiatives by other utilities (e.g. Terasen). The interests of the major utilities are often closely aligned with those of provincial ministries. i.e. reduced demand, stability of supply, economic efficiency. Formal agreements between these parties for the purpose of expanding the range of community energy and air quality incentives will further local government efforts.

- **Work with ICBC to Establish New Classifications**
  Insurance classifications are needed for new alternative vehicles and modes of transport (e.g., transit shuttles; the Segway) to permit municipalities to take these up in their fleets.

- **Establish Partnerships with Program Delivery Agents**
  The Community Energy Association (CEA), and Pembina Institute, respected NGOs with significant expertise in CEP education and extensive experience in BC municipalities, are two of the limited number of likely delivery agents for air quality-related integration planning. With sufficient financial and program support, CEA could develop air quality integration templates, and provide both community awareness and technical support.

E.4 Increase Financial Capacity and Affordability

The provincial and federal governments could develop funding mechanisms or tools that further assist municipalities with financial aspects of planning and implementation. This might include:

- **Developing revolving funds** where increased efficiencies from energy systems can be utilized to pay back some or all of the capital improvements.
- **Facilitating bulk purchase agreements** for green materials, supplies, and equipment that delivers energy and emissions benefits to the community for projects that are typically included in energy or emissions plans.
- **Providing a consultancy service to small communities** that can assist municipalities in moving forward on one aspect or a fully integrated plan. This service may be best delivered by a respected and knowledgeable third party (i.e., NGO).
- **Providing direct funding to municipalities:**
    - **to hire an Energy and Emissions Manager** to complete integration plans and develop detailed action plans / strategies. Most of the case studies cited in this study had dedicated staff to identify and access available funding sources in order to offset costs to local government, staff time and knowledge that many smaller communities do not have available.
    - **for program support** to undertake research and inventories, and support integration planning implementation, including investment in community infrastructure. Relatedly, the federal government should continue with the Green Municipal Enabling Fund (GMEF). Funding support for program implementation is required. Funding for education and promotional programs would also be valuable as well;
    - **for community infrastructure.** Relatedly, the federal government should continue with the Green Municipal Enabling and Infrastructure Funds (GMEF & GMIF), especially to conduct feasibility analyses for new energy infrastructure, funding for building energy efficiency and renewable energy projects, as well as continuation of the Canada-BC Infrastructure Program, EnerGuide rebate and related programs;
    - **for community transit.** Transportation is the single largest source of GHG emissions in the province, accounting for 42% of the province's total GHG emissions as well as a major source of CACs. Transit provides an affordable, convenient and timely alternative to the automobile.
- **Supporting aggressive promotion and related incentives** for home energy audits and retrofits will assist local government to achieve emissions reductions and energy efficiency in the short term. The retrofitting of existing building stock within municipalities is one of the most effective ways to reduce both energy consumption and greenhouse gas emissions. The primary group for this activity are owners of single family homes, and incentives are required to trigger widespread energy retrofits with this group.

E.5 Co-ordinate Related Provincial/Federal Initiatives

A number of initiatives are best undertaken jointly between the provincial and federal governments and their respective agencies. These could include:

- **Coordinating data/ reporting requirements of municipalities:** The Province could assist municipalities to coordinate the various mandatory and voluntary reporting requirements.

This may include potential reporting to the National Pollutant Release Inventory (NPRI), Partners for Climate Protection (PCP) and Voluntary Challenge and Registry (VCR). Provinces may also adopt a target that helps drive municipal action (for example, Oregon set a target of a 20% reduction in GHG emissions by 2005).

- **Providing access/information about federal programs through provincial web sites:** The plethora of information regarding the three planning processes, and technical and funding mechanisms available to support initiatives is overwhelming. Having a single portal for this information would reduce the effort required to research resources.
- **Reviewing Federal tax policy:** Environmental, energy and tax policies should be reviewed to identify areas where objectives conflict, and where tax policy may disadvantage emissions and energy plans which typically call for increased transit, higher building performance requirements, environmental protection, and the switching from fossil fuel energy to renewable sources. For example, federal tax policy may penalize municipalities that wish to engage directly in the energy sector. The capital cost allowances for energy-related equipment such as boilers is much larger for industry than it is for municipalities. The Province should work with the federal government to examine and resolve this inequity.
- **Increasing both fuel efficiency and emissions standards for all vehicles and off-road engines:** One of the cornerstones of the Federal Climate Change Plan is increased fuel efficiency standards. Although local governments have no control over such standards, these emissions can cause significant problems for air quality in local airsheds. Increasing expenditures by senior governments in this area can provide savings in other areas which may currently be the focus of "end of pipe" air quality problems.
- **Reviewing standards for marine vessels. Marine vessels** are primarily under federal jurisdiction, yet local governments must often address the associated air quality impacts. The existing standards for the sulphur content of bunker fuel (NOx emissions) are minimal compared with land-based standards. Better fuel standards (lighter fuels with lower sulphur content), emission reductions technologies to reduce PM and NOx, shore power while moored, and differential moorage fees for heavy polluting vessels could all contribute to better energy and emissions performance.
- **Promoting clean and bio-based fuels** including lobbying petroleum companies to significantly expand the production and distribution of biodiesel and ethanol fuels, as well as minimizing taxes on new cleaner fuels. Biofuels form a key part of the federal climate change plan and local governments have little or no sway with petroleum companies. For example, even though the GVRD is undertaking a 21-municipality fleet fuel purchase block to raise the issue of biofuels, the current fuel contract supplier is resisting this progressive initiative.
- **Recognize good work through awards and profiles:** Senior governments could offer support by further recognizing communities that have done work in this area – the FCM sustainability awards are an example. City councillors and mayors are especially influenced by recognition programs. Their decisions ultimately impact on policy and resources that are central to the start or success of any integration plan.